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THE BUILDING NEWS

AND ENGINEERING JOURNAL.

THE GREAT YARMOUTH TOWN HALL COMPETITION.

GREAT YARMOUTH, until recently somewhat backward in architectural progress, has of late made a fresh start. The Aquarium and Winter Garden now in progress are about to be followed by the erection of new municipal buildings to replace the present old Classical structure, which affords very inadequate accommodation. Forty-two designs have been received in response to the invitation of the Town Council. The instructions to architects proposed certain locations in respect of the chief official departments, which have somewhat restricted the competitors, but at the same time these hints have prevented differences in the interpretation of the requirements, and have afforded a certain and definite basis to work upon. An exceptionally good site, facing the river Yare, is provided, being a quadrangular area of about 108ft. frontage and 130ft. in depth. The points of importance are, that the town clerk's, surveyor's, and accountant's offices and committee-rooms should be in easy communication with each other on the ground floor, that distinct entrances should be provided at convenient points of the surrounding streets, and that a spacious entrance hall and staircase should form a prominent feature of the building. The lighting of the hall and corridors presented some difficulty in a building of the proportions fixed. Separate entrances for the quarter and petty sessions courts, readily reached from chief constable's office, are equally desirable, and the separation of the courts from the municipal departments, as far as practicable, was necessarily one of the chief qualifications of the plan, though it has been lost sight of by some competitors. Every conceivable variety of style, from Roman to Renaissance and Gothic, is exhibited in the designs submitted, though Classic, of some variety, seems to be predominant. Much ingenuity has been exercised in the means employed to obtain light and communication between the offices. Some designs show straight corridors, with end entrances, intersected by cross passages; others make the central hall the main centre from which the corridors ramify, while many show a square ink of corridors forming an inner circle of communication. One of the most striking instances of the central hall arrangement is "Beacon." The entrances lead to a large hall, with a grand staircase of segmental shape, behind which is an open court for light. The gentlemen's cloak-room is placed here. On the west side is the entrance to the law courts, having a circular staircase, with good corridor connection. The principal floor has the two courts separated by the circular staircase approach, and are placed at the north-west and south-west angles. The assembly-room has a refreshment buffet at one end. We object to the rather crooked and ill-approached surveyor's offices on the ground floor. An alternative plan has a similar arrangement, but rectangular flights of stairs are substituted for the segmental form. The surveyor is at the north-east corner, and the town-clerk at the north-west. A good point in the plan is that the constables', witnesses', and barristers' rooms are located below the courts on the east side. The stair approaches are well planned. "Beacon's" first design is a classical Roman composition, an order on a basement, a centre octagon cupola being over the main entrance; his alternative scheme is Renaissance of a refined character, but the north front is very irregular, a good tower being spoilt by a gabled chimney. The drawings are well executed, and there is a clever ink perspective; but much labour has been wasted in showing an elaborate scheme of ceiling decoration.

"Use" is the motto of another good plan, with a central hall and area, around which the departments are grouped. On the ground floor a covered archway divides the south front of the building; distinct entrances are provided, but the corridors leading from the central hall to the accountant's and inspector's offices appear to be badly lighted. There is little waste of room in this plan. The quarter sessions court occupies the assigned location, and is placed lengthwise to the Hall Square side; the small court is placed along the east side, separated by the stair approach. The public hall has an orchestra, with stairs. A heavy gabled-sided tower in the Gothic style, but of bad proportions, emphasises the entrance front. Much skill is, however, shown in the section and plans. One of the best designs is certainly that of "Bona Fides." It is shown by a very artistically coloured perspective exterior, in a sensible style of plain semi-Gothic character, and is proposed to be built in red brick and stone. The elevations are clever line drawings, and simplicity and dignity pervade the treatment. The plan shows one wide transverse corridor from the main north entrance to the south front, a central hall and area for light forming a widening out. This is crossed by two other corridors running east and west, with end entrances. The area for light is too small. The town clerk's department is on south side, the accountant's at the north-west, and the surveyor's at the north-east corners. We like the principal plan better, especially as regards the courts, which have good public entrances and jury and dock stairs. The main staircase is rather narrow, but it gives direct access to the assembly-hall, which is 84ft. by 46ft., with a recessed orchestra, and retiring-rooms in the angles. One merit of this plan is that the main staircase and its landing is quite distinct from the courts, which have their own corridors round the three remaining sides of the centre area. Each court has its own separate staircase for public use, and that to the petty sessions court at the N.E. angle is treated as a pleasing octangular turret externally. "Old English" is the motto of a design Renaissance in style, with some good detail and clever line elevations, but with an awkward plan. The town clerk's and accountant's departments are on the west side. There is a large waiting hall and entrance from Hall-square, separate court stairs, and tolerably well-lighted corridor communication, though we do not quite see how the ladies' cloak-room is to receive that indispensable requisite—the words, "lighted above roof line," not being very clear on examination of the section. The main staircase is lighted chiefly by a skylight and open area. On the first-floor the courts adjoin with separate public stair approaches, and stairs also from the constables' office to the dock. The Hall Plain elevation is cut in two by the tower over the entrance, the hall being pronounced, and the surveyor's office block kept low. One of the best-studied plans is undoubtedly that of "B," in a triangle. The author adopts the central hall idea, with a wide main entrance to the north, and two other entrances from Hall-square and South-quay, the former giving access to the courts and the latter to the offices, a straight corridor connecting them. The departments of the town clerk and surveyor are located on the Hall Plain front on each side of the entrance, the accountant's offices are placed close to the official entrance, and the constable's in

he part assigned in the instructions. The author seems to have carefully followed the instructions. An alternative arrangement shows a private entrance for prisoners, but the cells by this plan are divided. On the whole, this is a clever plan, and the superficial areas have been closely worked out. We do not quite like the entrances to the town clerk's offices; there is scarcely sufficient light given to the stairs and hall, and the proportion of the quarter sessions court and its entrances might be improved; thus it would have been better if the hall landing had been quite cut off from the courts. We observe there is no orchestra or retiring-room to the assembly-hall. In elevation a free Renaissance style has been chosen, and but for the rather low octagon stage of the tower there is much to commend in the excellent line drawings exhibited. "East Coast" shows some clever planning, the author adopting what we have called the central hall scheme. There is a square court, with a glazed dome for light and air in the middle, with stairs in the centre, and a surrounding gallery. Around this are grouped the offices. The municipal departments are well shut off from the magisterial, and the courts are at the north-east and north-west angles, separated by a landing and stairs, with separate police access. In style we have a simple Classic treatment, with a slightly projecting tower of dignified character. It is in fact one of the most successful towers shown in the room, the square being surmounted by an octagon bell cupola. The pencil perspective does it more justice than the poorly-tinted elevations. "Sub Spe" lacks congruity of feature in the tawdry-coloured Gothic elevations by which it is shown. The plans embrace some good points. Entrance to the municipal offices is on the South-quay side, the court and police entrances on the east, with public and hall-keeper's entrances in the south front. The surveyor's and inspector's offices are on the last-named side, the town clerk's and accountant's facing the river. The lighting of the hall and corridors appears defective. On the principal floor the sessions and magistrates' courts are at the north and south-east angles, with good stairs between, communicating by corridors round main staircase and open area. There is much compactness in the plan; but the Queen Anne elevation is below par. "Well Considered"—one of the favourites, we hear—is shown by a large ably-drawn pencil perspective in an ornate Florentine-Italian style, but much too palatial and costly in character. The plan has merit. In the entrance hall a wide flight ascends to the assembly-room, 102ft. by 44ft. 6in. A square link of corridors connects the hall with the several departments. The hall and corridors are lighted chiefly by a lantern above the stairs; the courts are well connected by corridors, with good public and private entrances between them on the eastern side. Among the noticeable designs in a Continental Gothic style is a circle with three red stripes as motto. Some good detail is exhibited. There is a lofty entrance tower, spoilt by a dormer perched at the apex of a sloped roof. In the plan we note that the corridors are ill-lighted, the cloak-rooms receiving most of the light from the open middle area. The town clerk's and accountant's departments are well planned, and the connections good; they face the Quay. This is the best point in the plan. The surveyor's offices are out of square at the north-east angle—a mistake other competitors have fallen into. One peculiarity of this plan is that the courts are arranged obliquely along the eastern line of boundary, and are placed end to end—a method adopted by one or two other architects. A good public lobby is shown between the courts, and stairs 5ft. wide. The assembly-hall is 90 by 45ft., with an orchestra and retiring rooms. "Keep Watch" adopts the same location of courts, and the plan possesses merit, inasmuch as the magistrates' department is self-contained, and placed along the eastern side. The town clerk's offices occupy the north-west angle, the accountant's and surveyor's the south-west. The hall and corridors below are not well lighted in parts. A large flashily-coloured distemper drawing shows the exterior, in which the author has evidently been inspired by a well-known design for the Kensington Vestry Hall; but the detail is poor. "Saxon" is a refined Renaissance design, shown by a series of admirably-drawn elevations in brown ink, rather too château-like. The ground plan is not skilfully disposed in its corridor communication, and the hall and courts are not happily arranged. An alternative bright red-coloured perspective in Gothic is shown, and a good ink perspective. We must notice, too, a design with the motto "Luke 22, 24 v.," in a Jacobean style. There is something refined about the elevations, and the ink perspective is cleverly drawn. The plan shows a grand central stairs and muniment room, with surrounding corridors poorly lighted. The municipal offices are located along the quay front, entered at both ends of corridors which run north and south. The entrances are distinct and ample, and the principal floor shows skilful arrangement of corridor connection, well-planned courts, with good stair approaches between. The hall has no orchestra. Another design indicating study is "One of Many," in a French Gothic style. An open area lights the corridors, but the accountant's and town clerk's departments are disconnected, and the corridor approach to the latter indirect. "Thought" is jumbled in arrangement, and the confusion is made worse by the fussy and stupid printing adopted. The surveyor's offices are on the South Quay front, and the town clerk's at the south-east angle. The lighting of the corridors is certainly defective. There are three entrances on Hall-square side, including the public entrance to the courts—the latter being arranged on the east and west sides of the building, with a public waiting-hall between. This hall is questionably common to both courts and concert-room. The elevation is poor Gothic, the Hall Plain front being very indifferent. In the design with "Munus" as motto the elevations are very distastefully coloured—the roofs are tinted in brown, and there is a lofty Gothic tower. The corridors and passages are dark, and there is a manifest want of contrivance and skill in the distribution and regularity of the departments. "Knowledge is Power" has some points in its favour; the courts are well lighted and connected, and the corridors form an inner circle of communication. There is an open area for light, with muniment and cloak-rooms in the centre. The accountant's and committee-rooms are at the north-east and north-west angles, the town clerk's offices along the South-quay, and the surveyor's facing Hall-square. The main staircase ascends over the entrance; this is economical, though, perhaps, objectionable architecturally. The assembly-hall, corridors, and entrances are narrow and inefficient. "Let the Best Win" is in an Early Gothic dress, rather French than English. The municipal offices occupy the South-quay front, the town clerk being located at the north-west and the accountant at the south-west corners, disconnected by a public corridor entrance. The offices of the surveyor are cramped, and are lighted from a court. The upper plan is deficient in its court communications. The hall is 81ft. 6in. by 49ft. 6in. "Comma," in circle, is in style a florid Gothicesque conception, shown by an elaborate ink elevation. It wants connection and proportion of parts. Easy communication between the offices—one very essential condition—is overlooked, and we fail to see how the corridors are to be lighted, the areas shown being very small. "All's Well" is noticeable for a lofty angle tower in florid Gothic that would alone run away with a considerable part of the contemplated outlay. The ground plan is cut up, the entrance narrow, the hall pillars unnecessarily expensive. We observe the town clerk's and accountant's offices are separated by the main entrance. It is a question whether this is the best means of arranging them, although many other designs adopt it. There is also an uneconomical distribution of corridors. The assembly-hall is 86ft. 6in. by 46ft. 6in. "Pom" has a central area for light, and surrounding corridors. The entrances to the offices and courts are poor and cramped. A very confused arrangement is shown by "Garianonum," which is dressed in florid Italian, with a singularly unpleasing curvilinear or domical roof over the hall, with a raised lantern. We note also "B with Arrow in Circle" as being wanting in compactness and concentration, and the corridors are badly lighted. The Gothic exterior scarcely atones for the plan. "Finis Coronat Opus" is the motto of another very distracting plan. The author is clearly a novice at planning, or he would never have adopted such winding corridors. "Utility" has a plan we cannot find much merit in, and the lighting is bad. What singularly puny Gothic windows to the offices! "L. W. X." is more like a Manchester warehouse than a town hall. The plan is puerile. "Caller Herrin," in a Flemish-looking Renaissance with an ink perspective, cannot be overlooked, but the plan is poor in parts, though there is a good general scheme of corridors and a central area. The accountant's and town clerk's offices are separated by a corridor, and face the quay. "Y" in a circle has a central galleried hall, domed. The plans are crude, and indicate want of study; the style is Palatial Italian. "Phœnix," also Italian, errs in the neglect to provide light to corridors, and the offices are not well approached. We can only glance at "Rex et Nostra Jura," an awkward plan, with poorly-lighted corridors. The open court only gives light to the cloak-room, &c. There is a general want of conception in the planning, despite its French Gothic and its clever Renaissance studies, in which some good detail is apparent. The open lantern in the clock tower is too lofty. "Congress," a bizarre design, in a tawdry species of confectioner's Gothic. The plan is remarkable for its rounded corners and its main circular staircase. We may just mention "Roma," "Leo" in intersecting triangles, "N'est Pas," "Yorkshire," "D" in circle, "Labor et Spes," "Circle," &c., as attempts that show either a misdirected ambition or a wonderful faith in the chances of competition.

Certain designs have won popular admiration, but we hope the committee of selection will be upon their guard and resist influences that may be brought to bear upon them. A sub-committee met on Tuesday last to make a preliminary survey, but nothing was done, and it will be probably another week or two before the result is arrived at. We hope the Council will obtain the aid of a professional man to assist them in their judgment. Such a course is the more desirable, as our examination of the designs has convinced us that many of them cannot be erected for the sum named in the conditions. One of the competitors, for instance, calculates his design at the ridiculously low figure of 6½d. a foot cube, while others have obviously never taken the trouble to calculate the cost at all. In view of the preposterously lofty towers and palatial façades of stone some of the com-

petitors display, more than usual caution will have to be exercised by the Town Council of Yarmouth in their adjudication, and, while the site and its architectural adornment must be kept in view, the economical arrangement of the public offices must be the leading consideration.

RAILWAY EXTENSIONS AND IMPROVEMENTS IN AND AROUND LONDON.

ABOUT a dozen years ago it was proposed by numerous bills brought into Parliament to construct complete inner and outer circles of railway communication round London—to construct new lines travelling athwart the metropolis in all directions, the works including several new railway bridges across the Thames. Some of these schemes have been partially executed, and much of the accommodation they promised has been provided, but by much less costly routes and methods than were then proposed, existing lines and bridges being utilised for new connections. "Outer circles," with variations, have been completed, and the "inner circle" has been crossed, before it has been joined up, as it should have been years ago.

The London, Brighton, and South Coast Company have new lines and works in progress at Newhaven, and towards the southern part of their system; but the most important project the company have in hand, with a view to the increased accommodation of their great and growing traffic, main line and local, is the complete remodelling of the lines, platforms, and signals at London Bridge station, by which, practically, the platform accommodation will be doubled, without any addition to the present area of the yard. Two new lines are being laid into the station, and two new platforms constructed to serve them. On the completion of the works the company will have eleven lines and platforms in the station—including the South London—all these lines being available for either arrival or departure trains. This bold and novel mode of working the traffic is adopted with a view to obviating the delays that now occur to main line and suburban trains in entering the station. The system involves, as may be supposed, the introduction of a large number of points, and a great increase in the number of signals and quantity of interlocking gear. This important part of the work is in the very able hands of Messrs. Saxby and Farmer, signal engineers, who are fitting up a signal box that will not have its equal throughout the world as regards the number of levers employed—280 in one signal cabin, and 98 in another, closely adjacent, and working in connection with it, or 378 levers to work the station. The larger signal box will probably require the services of 6 or 7 signal men. Some single operations require a pull at 6 or even 8 different levers. The traffic will be worked strictly on the "block and interlocking" system, electrical block signalling instruments between one signal cabin and another forming an essential feature in the arrangements. The elaborate plan for the reconstruction of the station is by Mr. Banister, chief engineer, assisted, as regards the roads, points, and platforms, by the practical suggestions of Mr. Williams, traffic superintendent.

Our great railway systems now penetrate into districts and invade "territories" far remote from the areas to which the original promoters probably intended to confine themselves. The "London and York," commencing in 1848 with communications between Grimsby and Louth, Boston and Lincoln and Peterborough, afterwards, by union with the "Direct Northern Railways" and the "East Lincolnshire" line, became the "Great Northern," with a "territory" in the direction implied by its name. By subsequent connections with other companies it became enabled to carry traffic in passengers and goods to Newcastle on the north-east, to Manchester and Liverpool on the north-west, and to Edinburgh, Glasgow, Aberdeen, and Inverness, in the further north. The Great Northern has now overleaped the river Thames, that might have been considered the company's natural southern boundary. This has been accomplished by means of the connecting curve between the Charing-cross line at Guildford-street, Borough, and the Chatham and Dover line near Blackfriars station.

In the construction of this short line considerable engineering difficulties had to be grappled with. In taking out the foundations for the piers—the whole of the curve being built upon arches—the water came in in copious streams; but this powerful element was eventually beaten back and subdued, and the high and massive arches at the sharpest part of the curve are, in design, materials, workmanship, and apparent strength, very excellent examples of this kind of work, and creditable alike to Mr. Brady, the South Eastern Company's engineer, the contractors, and all concerned. At a short distance from Guildford-street the Charing Cross line passes under the Chatham, and the connection is necessarily on a rising gradient from the former line, but of not more than about 1 in 90. The curves, in one part rather sharp, are found perfectly practicable.

The line was completed many months since, and no obstruction to its opening was offered, we believe, by the Board of Trade inspector. The delay has been occasioned by sense of responsibility on the part of the superintendents of the four companies concerned in the working of the new service—viz., Mr. Cockshort, of the Great Northern; Mr. Harris, of the South Eastern; Mr. Hills, of the Chatham and Dover; and Mr. Myles Fenton, of the Metropolitan. These gentlemen naturally and properly hesitated to put additional traffic upon lines already crowded, and they had great difficulty in arranging a time-table satisfactorily. They have commenced with a limited service of six trains each way per day. There is probably no railway junction in or near London that will demand more complete rules and regulations as to signals, &c., and more watchful care in its working, than this.

It seems somewhat strange that, while this connection has been made by the South Eastern Company, and is a junction between that company and the Chatham and Dover in the first instance, the Great Northern Company should have the working of the traffic by their engines, carriages, and guards between Woolwich and the Great Northern system. But that matter concerns the companies rather than the public, whose only interest is to be carried quickly, cheaply, and safely.

Passengers to Woolwich Arsenal by the new communication who desire to proceed further on the North Kent line will change carriages at Woolwich; and passengers to King's Cross who desire to take the Great Northern main line will change from the Great Northern Suburban to its main line station, which closely adjoin each other. The limits of the new service, locally, are between Finsbury Park and Woolwich Arsenal stations, with 14 intervening stations, at all of which the trains stop. The time for the journey is about an hour, and the stations include, among others, Blackheath, New Cross, London Bridge, Ludgate Hill, Farringdon-street, King's Cross—Metropolitan and Suburban—and Holloway. The semaphore signals on the route are very numerous, and involve the study on the part of the engine-drivers of about forty diagrams, in addition to the letterpress in their instructions. Although the traffic has not been heavy as yet, it has been satisfactory, and pronounced a great convenience by those who have availed themselves of it. The service is smooth and effective, notwithstanding the difficulties that attach to it.

The through bookings which this communication renders practicable are only partially arranged as yet, and these facilities will doubtless be greatly increased; but, practically, with changes at Woolwich or London Bridge of the South Eastern, and at King's Cross or Finsbury Park of the Great Northern, the whole of the systems of the two companies are brought *en rapport* with each other. The through bookings already arranged extend from Woolwich to—amongst a host of other towns—Cambridge, Peterborough, Sheffield, Manchester, Liverpool, Doncaster, Leeds, Bradford, and York.

The Midland is now a misnomer, as applied to the enterprising and ever-extending company that bears that name. It was appropriate enough in its early days, when it had provided railway communication between places in or near the heart of England—Derby, Leicester, Nottingham, Lincoln, Birmingham, &c. Now, by the extension of the company's lines, they reach numerous ports on the Irish Sea, the Bristol and English Channels, and the German Ocean, and ere long the company will reach, by its own line, its extensive docks at Blackwall. By arrangements with other companies the tentaculæ of the Midland now embrace almost all parts of the United Kingdom, inland and on the coast, and certainly all the most important cities and towns in Great Britain, with Dublin, Belfast, Londonderry, and many other places in the sister kingdom. Through these connections the Midland books to localities very far removed from the headquarters at Derby—even to places beyond our shores, including Honfleur, Dieppe, and Paris; the Channel Islands, the Isle of Wight, the Isle of Man, Stornoway, and the Isle of Skye; it reaches to the toe of England at Penzance, and to the *ultima Thule* of Scotland at Wick and Thurso, connecting with steamers proceeding even further north to the Orkney Islands.

One of the most recent extensions of the Midland is the completion of an outer girdle round London, which brings a charming and extensive suburban district into communication with the Midland and other railways. This new Metropolitan Extension consists of a route round the north of London, by which passengers may travel on the Midland lines from Moorgate-street to the Mansion House, without change of carriage or detention, except for a very brief space at the new station at Earl's Court. The travelling public are already familiar with the northern and southern portions of this route—the one by the low level from Moorgate-street or the high level from St. Pancras, the other by the District Railway from the Mansion House to Earl's Court. The new connection is between these outer stations. There is a service of fifteen trains per day round the circuit, the time occupied between Earl's Court and Kentish Town being about 50 minutes, and for the whole distance between Moorgate-street and the Mansion House about 1 hour 40 minutes. The service is in keeping with the high reputation of the Midland Company for the excellence of the accommodation it provides. The carriages are first and third class—the so-called thirds being greatly superior to the second-class carriages to be seen upon some other lines. They have stuffed seats, parcel racks, hat straps, plate-glass door frames and

elbow lights, and are as roomy and lofty as could be reasonably desired. The carriages are really first and second—the second at third-class fares.

At a short distance beyond the St. Pancras station the high and low-level lines of the Midland join each other near Camden-road station, after crossing the North London line. Taking the new route and passing on from Kentish Town, Hampstead junction line is crossed, and the train reaches the station at Haverstock-hill, the greater portion of the road to this point in deep cutting, tunnel, or covered way. At Finchley-road the line enters upon its progress through very beautiful districts, presenting a variety of scenes and objects of interest; in one place undulating, in another as level as a bowling green; in one place partially residential, in another purely rural; here an orchard or pleasure garden, there a pasture field, well stocked with browsing cattle, or nibbling sheep with their lambs frisking about. Between Finchley-road and the new station at West-end the Hampstead junction line is again crossed, and from the station last named the train passes on in a north-westerly direction to Child's-hill and Cricklewood station, a little beyond which the new line has a fork uniting it with the main line of the Midland for Leicester and the North, and the main and local lines for St. Pancras and Moorgate to the south east. Here the new line bends round in a south-easterly direction to Dudding-hill station, one of the prettiest parts of the route; in this locality building operations are being extensively prosecuted, and many detached and coupled villas and houses of other classes have been recently completed, or are in progress, some of them quite imposing in appearance, the high-pitched flat red tile roofs being a notable feature. Harrow-road is the next new station, from which the line passes nearly due south, with Willesden junction within the circuit, at a little distance on the easterly side; it then crosses over the main lines of the London and North-Western, and the Great Western, and reaches in succession the stations of Acton and Turnham-green, both very pleasantly situated, and although giving evidence that a more populous district has been reached than those left behind, surrounded by abundant verdant beauties. At Turnham-green passengers change carriages for Gunnersbury, Kew Gardens, a ten minutes' run, and Richmond, which is reached in fifteen minutes. From this point the head of the train is turned in the direction of the Mansion House, and, passing in part through a highly cultivated market garden district, the stations at Shaftesbury-road, Hammersmith, and West Kensington are reached in succession, and next the new station at Earl's Court, where, for the present, the Midland train stops, and the passengers are transferred to the trains of the Metropolitan District Company, for which they have seldom to wait more than two or three minutes. Although the carriages of the District Company are as good as others generally, the third-class passengers will find their accommodation in contrast with the exceptionally luxuriant thirds of the Midland, from which they have alighted. The distance from Earl's-court to the Mansion House is accomplished in about 23 minutes.

By another route the Midland trains might complete the circuit of London; passing on from Addison-road, and crossing the river at Chelsea, they could, viâ Battersea, Clapham, and Loughborough, proceed northwards to Ludgate and Farringdon-street stations, which would join up the circuit.

The stations on the new route are brought into connection with almost the whole of the Midland system by through booking to a vast number of stations, including Manchester, Liverpool, Leeds, Glasgow, Edinburgh, and even places as remote as Inverness and Aberdeen. The "residential" traffic on this line cannot fail to increase rapidly, and the large coal depôt that the company has commenced to build at Kensington will doubtless prove a profitable investment, as well as a great advantage to the locality. The Midland trains will run through from Earl's Court to the Mansion House when that station has been enlarged, as is in contemplation.

THE CHEMISTRY OF BUILDING MATERIALS.—VII.

METALS. (*Continued.*)

LEAD is a metal of great utility in building operations, both in its pure metallic state and also when chemically united with other elements. It is not found pure in nature, but is generally obtained from a mineral called *galena*, in which it is united with sulphur. A portion of the sulphur is expelled by roasting the ore at a moderate temperature, leaving a sulphate and oxide of lead; and, on the application of a higher degree of heat, the metal is obtained in a molten condition, while the other elements pass off in the form of sulphurous acid. The melting point of lead is 620° Fahr., and it shrinks in bulk as it cools; it is a very heavy metal, its density being $11\frac{1}{2}$ times that of water. The lead obtained from English ore generally contains a small proportion of the metal antimony, which renders it too hard to be rolled; but it can be softened by exposure in a melted state to the air in a shallow vessel, when the antimony and part of the lead become oxidised and form a dross on the surface which can be skimmed off until the lead is sufficiently softened to be *milled*. Sulphuric and hydrochloric acids have very little effect upon pure lead, but it is easily dissolved by dilute nitric acid. When exposed to moist air it soon tarnishes by the formation of a grey coating of oxide, but the oxidisation does not proceed further, nor does the lead become deteriorated by exposure, as is the case with iron. Sheet or milled lead is largely used as the lining of water-tanks, and this can be done with impunity provided the water is not perfectly *pure*, but contains soluble salts, as sulphates, phosphates, and carbonates. Pure or rain-water, however, is liable to be rendered poisonous by being kept in lead cisterns or passed through lead pipes; for an oxide of lead is formed which is partly dissolved by the water, from which it absorbs carbonic acid, and precipitates the insoluble carbonate of lead, while a fresh coating of oxide is formed, to be again dissolved by the water; so that not only is the lead corroded, but the water is also rendered poisonous by the oxide of lead dissolved in it. When, however, the water contains sulphate or carbonate of lime or other salts, the corrosion is prevented by the insolubility of the oxide in such water, and a thin coating of carbonate or sulphate of lead, adhering firmly to the metal, protects it from injury; a small quantity of vegetable matter, if present in the water, will also render it innocuous by combining with the oxide to form an insoluble coating. If water is suspected of containing lead-salt in solution, its presence can be generally detected by passing sulphuretted hydrogen gas through it, which forms a dense black precipitate of the sulphide. If the chromate of potash is added to a solution of a soluble salt of lead a fine yellow precipitate of chromate of lead is obtained, which affords a good test for its presence in water; the pigment known as *chrome yellow* being obtained in this way. If chrome yellow is boiled with caustic potash, part of the chromic acid is removed, and the result is a red pigment called *chrome red*; and the mixture of these two colours produces *chrome orange*.

White-lead, which is the basis of most of the pigments used by the house decorator, is the carbonate of lead obtained by exposing sheet lead to the action of carbonic acid. It is a soft heavy white powder devoid of taste and smell and insoluble in water, but dissolved by dilute nitric or acetic acids, and contains from 84 to 86 per cent. of lead oxide with from 11 to 15 per cent. of carbonic acid, and 1 to 2 per cent. of water. This material is frequently adulterated by the addition of sulphate of lead, chalk, carbonate or sulphate of baryta, and pipe-clay. The presence of these can be detected by using dilute nitric acid, which will dissolve all the carbonate of lead, so that any insoluble residuum indicates the presence of other substances. If caustic potash is added to the solution in the acid, and a precipitate is obtained, the presence of chalk will be indicated.

Litharge is an oxide of lead much used in the arts, and is prepared by heating the metal in a current of air, when the oxide forms in pale yellow scales fusible at a red heat. It forms one of the ingredients in *Mastic*, which we have previously described under "Cements."

Massicot is a yellow pigment obtained by heating carbonate or nitrate of lead, or by calcining the metal in a reverberatory furnace.

Minium or *red-lead*, largely used by the painter, is an oxide of lead which contains a larger proportion of oxygen than litharge does; it may, therefore, be obtained by adding oxygen to litharge, which, when heated to about 600° Fahr., in a current of air, absorbs oxygen, and is converted into a fine red powder of high specific gravity.

ZINC, which is a metal now largely used in buildings, is obtained from ores in which it is combined either with sulphur or carbonic acid; the mineral called *blende* containing it in the form of sulphide, and that known as *calamine* being a carbonate of zinc, both of which are found associated with lead ore. These ores are first roasted to remove the sulphur and carbonic acid so as to leave the pure oxide of zinc, which is then mixed with powdered coke or charcoal and raised to a full red heat, so that the zinc being volatile is distilled in form of vapour and received into a condenser, while the oxygen unites with the carbon and escapes as carbonic oxide. This metal is highly crystalline and very brittle at ordinary temperatures, but when heated somewhat above the boiling point of water it becomes sufficiently soft to be malleable and allow of being rolled into thin sheets, after which it retains its malleability when again cooled. If, however, it is heated above 400° Fahr. it again becomes very brittle, and can be reduced readily to a powder. Its melting point is 773° Fahr., but if heated to 1,900°, or a bright red heat, in a closed vessel it boils and volatilises, and if exposed to the air will burn with a bright green flame; on this account it is hardly a safe material to use for roofing purposes, as it cannot be considered as a fireproof material. Its density is 7 times that of water or less than two-thirds that of lead; while its tenacity is double that of lead; it is consequently preferred in many cases to the latter metal where a light and cheap covering to a roof is required. When exposed to moist air zinc quickly oxidises, but the film of oxide serves to protect the metal from further corrosion, and consequently it is used as a protection to sheets of iron which are "galvanised" by being dipped in a bath of molten zinc which has been covered with sal-ammoniac to dissolve the oxide of zinc from the surface; the zinc forms an "alloy" with the surface of the iron and will protect it from rust for many years. This metal is rapidly dissolved

by dilute acids with evolution of hydrogen gas; its use must therefore be avoided where it is liable to be exposed to acid vapours of any kind.

There are several preparations of zinc which are useful to the builder, one of which is *zinc-white*, an anhydrous oxide sometimes used as a pigment in place of white lead. This is prepared by oxidising zinc in fire-clay retorts placed in a reverberatory furnace, which is heated to whiteness, and the vapour of the metal brought in contact with a current of hot air at 572° Fahr., when the oxide is formed and carried into a condensing chamber. It is pure white, very light in weight, and is not discoloured by sulphuretted hydrogen gas. A yellow pigment also can be obtained by precipitating a solution of sulphate of zinc with bichromate of potash and thus producing the yellow *chromate of zinc*. The *sulphate of zinc*, called *white vitriol*, is prepared by dissolving zinc in dilute sulphuric acid, or by roasting the native sulphide; this is used by painters as a *dryer*. If the sulphate is dried and heated with common salt (chloride of sodium), the *chloride of zinc* is obtained, which is much used both for preserving timber and as a disinfectant.

TIN is a valuable metal found in ores either as an oxide or sulphide, and associated with those of iron and copper. The sulphur is expelled by roasting and the oxides of iron and copper are removed by washing; the tin can then be reduced by strongly heating with powdered anthracite or charcoal, and is run into bars. The melting point of tin is 442° Fahr., and its specific gravity is 7·3, or a little above that of zinc. It is more malleable than either zinc or lead, and its tenacity is between these two metals. It can be rolled into very thin sheets called *tinfoil*, and when pure can be recognised by a peculiar crackling sound or "cry" which it emits when bent between the fingers. If heated to full redness it will burn with a bright flame, but at ordinary temperatures moist air has little effect on it, so that it forms a good protection to sheet iron, which, when dipped in a bath of molten tin and coated with it, is known as *tin-plate*. For roofing purposes a material called *terne-plate* is sometimes used, which is sheet-iron coated with an alloy of tin and lead; this is chiefly made for use in Canada. The chief value of tin to the builder is when mixed as an alloy with other metals.

A beautiful purple pigment is obtained by dissolving tin in strong hydrochloric acid, so as to form the *chloride of tin*, which, being mixed with chloride of gold, produces the powder known as *purple of Cassius*.

COPPER is occasionally found in the pure metallic or *native* state, but by far the largest supply is obtained from the yellow ore, which is a sulphide of copper and iron known as *copper pyrites*. The ore is first roasted to get rid of some of the sulphur, and then melted with silica until the iron combines with the silica and forms the silicate of iron, leaving the sulphide of copper in a separated form. This is again roasted, to expel the sulphur and reduce the metal to an oxide, which is kept stirred up until the oxygen and remaining sulphur have passed off as sulphurous acid and metallic copper remains. *Malachite* is also an ore of copper rich in that metal in form of carbonate; but, from its beautiful green colour and capability of receiving a polish, it is more highly valued for decorative purposes than for producing the metal. The density of copper is 9 times that of water, and its melting point 1,990° Fahr. It possesses considerable malleability and ductility, and is also an excellent conductor of heat and electricity. Copper tarnishes rapidly when exposed to the air, but is very durable when used as a covering for roofs or as nails for fastening slates, not being acted on readily by any acids except nitric, which dissolves it with violent action. It forms valuable alloys with other metals, and is also the basis of many beautiful green and blue pigments employed both by the decorator and the glass manufacturer.

Carbonate of copper, which gives a green pigment, may be produced by warming the sulphate with carbonate of soda; or malachite may be ground up for the same purpose. *Verditer* is another pigment obtained by the action of nitrate of copper upon chalk. *Verdigris* is the acetate of copper, and can be obtained either blue or green, and may be used either for oil or water-colours, but is highly poisonous; when mixed with white lead and oil it forms a a bright blue which afterwards turns to a fine green. *Schele's green* or arsenite of copper is one of the most poisonous of all the pigments, being a mixture of hydrated oxide of copper with arsenite of potash. *Emerald green*, which is also very poisonous, consists of 31 per cent. of copper oxide, 59 per cent. arsenious acid (arsenic), and 10 per cent. of acetic acid, forming an aceto-arsenite of copper; it is produced by mixing boiling solutions of arsenious acid and acetate of copper. A non-poisonous green pigment can, however, be obtained from the sulphate of copper by mixing it with the stannate of soda, which is a compound of soda with oxide of tin. If the hydrated oxide of copper is finely ground and mixed with water or gum, it gives a bright blue pigment; but if mixed with linseed oil it becomes green, and various hues can be obtained by mixing it with pure gypsum or plaster of Paris. The red oxide of copper is obtained from the sulphate (blue vitriol), and is used for producing *ruby*-coloured glass. A violet-blue pigment is also obtained from a sulphide of copper which is made by fusing the metal with a mixture of other sulphurets. The blue sulphate of copper above referred to is its most important salt, being produced by boiling the metal with dilute sulphuric acid (oil of vitriol).

ALLOY is a mixture of two or more metals when in a liquid or molten state; and the four metals which we have just been considering form alloys of great value to those concerned in building or engineering operations. The mixture of two metals to form an alloy is of so intimate a nature that an entirely new material is produced, having properties widely different from those of its ingredients in a separate condition. It is always observed that the melting point of an alloy is lower than the average of that of two constituents, and sometimes is lower than that of either of them. *Common solder*, used by the plumber, is an alloy of equal parts of lead and tin, and melts at 385° Fahr.; *fine solder* consists of 2 parts tin to 1 part lead, and melts at 372° Fahr., while tin itself melts at 442° and lead at 617°. In using solder for the purpose of uniting two pieces of metal it is necessary to have the surfaces quite free from oxide, and either sal-ammoniac or rosin are used to protect the surface from the oxygen of the air while undergoing the process. *Brazing* or *hard soldering* for uniting the edges of iron, copper, or brass, is an alloy of brass and zinc used with powdered borax to dissolve off any oxide from the surface. *Brass* is an alloy of 2 parts copper to 1 part zinc; while bell-metal, gun-metal, and *bronze* are composed of from 4 to 9 parts copper to 1 part tin; and if more tin is added the bronze becomes harder and more brittle; small additions are sometimes made of lead and zinc. *Pewter*, consisting of 4 parts tin to 1 part lead, is used for making small gas-pipes.

GOLD is a metal that may be regarded as a building material from the fact of its being largely used in the form of *gold-leaf* for decorative purposes, for which its bright and unalterable colour renders it peculiarly valuable. This metal is one of the few found in nature uncombined with other elements, although it is often alloyed with silver, and is obtained in the granitic or slate formations, and in combination with quartz rocks. To extract it from the ore mercury is used, which forms an amalgam with the metal, and can afterwards be distilled off by heating in a close vessel when the pure gold remains behind. Gold is the most malleable of all metals and capable of being hammered into leaves of which 280,000 would make 1 inch in thickness. In this form it is applied for decoration by means of gold-size or varnish, which causes it to adhere firmly to any prepared surface. It is a very heavy metal, its weight or density being 19½ times that of water, and its melting point 2,012° Fahr. None of the strongest acids when applied separately have any effect upon pure gold; but when nitric and hydrochloric acid are mixed so as to form *aqua regia*, gold can be dissolved thereby, and a yellow solution obtained which is the *chloride of gold*. If this is mixed with the chloride of tin, a fine purple pigment is produced, which is used in the colouring of Bohemian *ruby* glass.

We will conclude our notice of the metals with a comparison of their qualities of tenacity, malleability, ductility, density, conduction of heat and electricity, and fusibility. 1. *Tenacity*; taking that of lead as 1, the tenacity of tin is 1¼, of lead 2, gold 12, copper 18, iron 27½, steel 42. 2. *Malleability*; gold stands 1st, copper 2nd, tin 3rd, lead 4th, zinc 5th, iron 6th. 3. *Ductility*; gold is 1st, iron 2nd, copper 3rd, zinc 4th, tin 5th, lead 6th. 4. *Density*; gold is the densest, and the order of the others is lead, copper, iron, tin, zinc. 5. *Conduction of heat*; gold is the best conductor, then copper, zinc, iron, tin, lead. 6. *Conduction of electricity*; copper is the best conductor, then gold, zinc, iron, tin, lead. 7. *Fusibility*; wrought iron and steel have the highest melting point—then cast iron, gold, copper, zinc, lead, tin.

HYDRAULIC CONSTRUCTION IN AMERICA.

HYDRAULIC construction forms a large and important branch of American engineering. Mr. E. S. Philbrick, C.E., a member of the American Society of Civil Engineers, in a recent paper, written and presented by him to the society, on the "Improvement of the South Boston Flats," lately undertaken by the Federal Government, and reported in the "Transactions," furnishes us with some important data upon sea-wall construction. The object of the works was to improve the upper harbour of Boston, which had become shoaled, owing to the reclamation of the marginal land on the banks of the tidal harbour. Like many growing cities, Boston had been encroaching on the tidal limits for years; wharves, streets, and buildings had been pushing their way out into the harbour, till it was found, as it is invariably, that the altered line of shore changed the currents, leaving former channels to be slowly filled by deposit, while the loss of the tidal prism thus caused seriously diminished the volume and scouring force of the main channels of water. It must be recollected that the tidal flow intensifies the power of the land water by damming it back for one-half the time, till the ebb takes place with an increased violence. Tidal currents give a definite resultant in some direction, influenced by the shores, and the flood and ebb tides often take different channels. The ebb, owing to its reinforcement by the land water, is generally supposed to be the most efficient in scouring, as it is more concentrative, but experience has shown that this is not always so. In the case of Boston Harbour the flood in one part was found to be much stronger than the ebb-tide, owing to the concentration of the volume of its flow, but before reaching a point opposite East Boston the flood lost its strength by lateral dispersion, and its velocity being reduced, as a matter of course deposit takes place. A similar phenomenon is found in all tidal rivers, and the question of the relative

power of the ebb and flow of the Thames, as our readers may be aware, has given cause for some anxiety respecting the deposit going on lower down the river. Such, then, was the state of things when the Board of Special Commissioners, constituted by the State Legislature in 1866, commenced operations. Surveys were commenced of the hydrographic features of the harbour, and the board recommended the enclosure of the South Boston Flats by a wall extending along the south side of the main ship channel towards Castle Island, connecting with the east side of Fort Point by a curve. By this means the ebb waters from a bay were to be led to contribute towards the current and velocity of the main ship channel, and thus prevent the dispersion of the ebb over the large area of flats. The scouring action of the ebb tide would also thereby be increased. In 1873 contracts for sea-walls were prepared by the commissioners, and the reclaimed land was sold. The filling in and walling were to progress simultaneously. We gather from the State specifications, printed in Mr. Philbrick's paper, some useful details of these walls. For the light sea-wall the trench was dredged 2ft. below low water spring tides, and the piling occupied a space of 9ft. wide, having five rows of piles 2½ft. distance from centres apart. The piles were to be driven into the hard clay stratum, and they were to be not less than 10in. at low-water mark. Upon them were spiked two layers of spruce plank, 12in. wide and 3in. thick, at right angles, and the spaces between the heads of piles, for a depth of 2ft., was filled and rammed with stone chip, ballast, or oyster shells. The wall was of the following dimensions:—From low water of spring tides to top of coping 18ft. in height, with batter front and rear. Width of wall at bottom, 9ft.; at top, 5ft. Granite rubble wall stones from 18in. to 2ft. thick, with headers and bonders, were used. The back of the wall was ballasted with oyster shells, making a slope of 45° to the base of the wall. The heavy sea-wall had a trench excavated of 45ft. width, its depth being 23ft. below mean low water. The trench was specified to be filled with broken quarry stones, none less than 75lb. weight, thrown in and deposited in layers of 4ft. each, compactly spread by divers to a slope on each side of 1½ horizontal to 1 vertical. This base of rough stones was 12ft. in depth, and its upper surface, upon which the wall stood, 18ft. wide. The wall to the height of 1ft. below low water was built with quarry-faced dimension stone of granite, laid in courses of 2ft. rise by the aid of divers, alternately of headers and stretchers. Each stone was specified to be at least 4ft., and not more than 10ft. long, 18in. wide. This base of squared stone was 14ft. thick at bottom, and gradually sloped to about 10ft. in height by 11ft. wide. From this point to the top the courses were laid in cement, with a batter of 2in. to the foot; and the whole height of the wall from the base of rough stones was 28ft., and its width at the top 5ft. The backing was of clean gravel cobbles or oyster shells, resting at a slope as steep as they will stand, or 45°, tapering to nothing at the top; above the ballasting is clay. The paper describes in detail the means taken to insure a proper alignment of the heavy sea-walls which were located a quarter of a mile from shore, and had curves of 908ft. and 2,368ft. radius. As the method adopted is very ingenious we may just give our readers an idea. Clusters of piles were driven about 100ft. apart and 50ft. back from the line of wall, so as to be clear of the foundation trench. One of these clusters was placed at the commencement of the curve, and another at its centre. Upon the latter a small platform was erected, upon which a small transit could be placed. By the instrument in the centre of curve the angles between the radial lines, marked by the clusters of piles round the circumference, were measured, and another transit on the cluster of piles at the commencement of curve laid off in succession, half the corresponding central angles intersecting the radial lines previously established, the points thus given became points in a curve 50ft. inside the line of the wall and concentric with it.

In the construction of a heavy sea-wall between docks 39ft. in height considerable precautions are detailed. From the greater erosive action of the waves on the bottom the sloped broken-stone foundation before-mentioned was not adopted, but the foundations were dredged about 4ft. below base of wall, and the trench filled up with broken stone. The bottom was a firm but fine clay, and several interesting experiments, which we cannot give here, were made to discover the resistance of this clay to pile penetration, and the resistance to "flow" of the material under great weights. It was found that the clay would bear a load of 5,000lb. per square foot without flowing out, but that an increase of load was accompanied by a tendency to flow. The wall in section was vertical on the inner or ballasted side and battered on the outside, the base being 18ft. wide, and the summit 5ft. Prony's formula was used in finding the horizontal pressure, or

$$P = \frac{Wh^2}{2} \text{ tangent}^2 \tfrac{1}{2} (90^\circ - \phi),$$

where P = the horizontal pressure on wall for a unit of length, W = weight of a cubic foot of filling material, h = height of wall, and ϕ the angle of repose of filling material measured from the horizon. Into the investigation of this part we will not enter here, as our readers are, no doubt, familiar with the theory. Owing to the semi-fluid clay and the free passage of water through wall and backing or ballast, the centre of gravity of the prism of the material acting at the back of wall is not at the point it is theoretically conceived to be when the prism is of homogeneous substance, and the resultant computed makes an angle of 30°, with the vertical having a value of 61,790lb., intersecting base of wall at a point 3·85ft. from outside of wall.

The result of the experiments proved that it was essential to keep the material behind the wall in such a condition that the angle of repose would be rather larger than shown. This can be insured by having the filling deposited in layers, each well consolidated and free from water, before the next is placed upon it, also by giving each layer a slope from the wall. The value also of a broken-stone base, having a good foothold and a wide spread, becomes apparent when we consider the soft and yielding nature of clay in a semi-fluid state. We have no space left to discuss the testing of cement used in the walls above low water, nor the *modus operandi* resorted to in filling behind the walls the semi-fluid material which exercised a great horizontal pressure. In the latter work extreme care is necessary to deposit the clay gradually, and to expel the water from each successive stratum.

NOTES FROM EDINBURGH.

EDINBURGH owes most of her richest specimens of architecture to charitable legacies, trustees considering it a duty to make any buildings needed for administration themselves memorials of the munificence of the gift. These have, in every case, the direct purpose of providing for the educational wants of the community. The School Board are now finishing the Canongate School, the last of the seven they intended to provide. These schools are but a fraction, however, of those in which elementary instruction, and that the best of its kind, is to be had at a very moderate charge. Owing to judicious outlay and naturally augmenting value of capital, Heriot's Hospital, the annual income of which now nearly amounts to the £20,000 originally left, is the parent of many large side schools in the City, and has even added two to their number since the School Board came into existence. The other institutions, known as the Merchant Company's Schools, provide the benefits of grammar-school instruction to a vastly greater number than the few whose case was first contemplated by the endowment.

The Fettes College is, architecturally, the finest piece of secular Gothic to be found in Scotland, though as an architectural composition it cannot be commended as a marvel. It was intended to provide a home and education for 50 boys, but is developing into a little Eton or Harrow, with three large boarding-houses for boys not on the foundation. These are self-supporting, and there is thus room for a great expansion of the system in proportion as it may succeed. The trustees have not yet erected the fourth boarding-house contemplated in the plan for laying out the grounds in front of the college, but have been busy in another way—in construction of a very extensive and expensive system of roads, and there is now easy access to the grounds from every public thoroughfare. They are also building an infirmary or sanatorium, with which the equipment of the institution may be said to be complete.

Housebuilding has not altogether come to a standstill, but a great amount is projected, and much is being done in the way of church-building. The three great Presbyterian bodies have floated their prospectuses for a great scheme of church extension to cost £300,000. The Established Church, which burdens itself with the erection of the building and endowment of the cure, and must open its churches free of debt, is not lavish of its means upon the architecture, and allows about £5 per sitting. The scheme embraces seven churches, of which two have been begun. The one for the district of St. Leonard's is by Mr. Lessels, in Early Geometric Gothic, and in its arrangements follows the ordinary usage, which delights in plenty of width to allow of galleries round end and sides of the building. The other is for the southern suburb of Mayfield, by Messrs. Hardy and Wright, and is an Early English church of the ordinary mediæval type, minus the chancel, and with aisles reduced to passage width, giving the interior the advantages of an unobstructed auditorium. These churches will accommodate about 950, and the cost, without the accessory of a tower or spire, may be £5,500. The United Presbyterian section have also several churches just about to be begun. The Free church for Mayfield is well advanced in its mason work. It is much more elaborate in its details than the others, and promises to be the finest in this respect of any church erected for Presbyterian services in the city. The church is designed by Mr. Blane in the French Gothic, with "showers of mouldings" and clustered shafts. It has nave and aisles, clerestory, and double transepts, with a tower and spire. The plan has been devised to have the congregation as much as possible equidistant from the preacher. The transepts have considerable depth, and the nave is proportionally short. The design includes a very shallow apse—segmental, and pierced with the long narrow lights sometimes found in old Norman examples.

Presbyterianism, fortunately for itself, perhaps, but unfortunately for architecture, does not require to build cathedrals. Its maximum of cubic space, and what may be called its packing-box system of arrangement, are fatal to architectural grandeur. Moreover, it is found that large churches and monster congregations are a great mistake, altogether unsuited for a congregational episcopacy, and that it is better to multiply the number rather than to enlarge the area of the buildings. The masterpiece of Presbyterian church architecture here is undoubtedly St. George's Church, or rather the dome, for which the church has been designed. The front only has been studied for architectural effect as a finish to the long vista of George's-street, and this dome, at least in the distance, impresses the spectator more than any other of the loftier monuments in the city's landscape, and is conspicuously distinct, when the others are hardly distinguishable from each other. Even with St. George's dome, however (the church being no loftier than the adjacent houses), Edinburgh has never had the aspect of a city where a cathedral church conspicuously holds it own amid the secular architecture round it. This reproach, if it be one, is now done away. Dr. McCrie, in his "Life of Knox," facetiously remarks that the Reformation did a good turn when it evolved the picturesque out of the larger churches in the land by reducing them to "ruins." The lamented Sir Gilbert Scott has shown how this might also have been done by reversing the process; and he has built up an edifice which near or at a distance is visible from many points, and relieves, by contrast of its varied outline, the rather monotonous grandeur of the streets around it. The lofty bulk of the roof of the new cathedral church of St. Mary (choir and nave being of equal height) is now the principal feature which, next to the Castle Rock and the everlasting hills, arrests the eye as it wanders over the landscape of the distant

city. St. George's dome, even with its magnitude as an element of grandeur, will hide its diminished head. The general public as yet have not taken any interest in this the greatest church built in Scotland since Reformation times, and by far the greatest marvel of architecture that adorns the city. This apathy, however, will soon disappear when its beautiful detail and proportions are unveiled—a result which will not be long delayed, as the whole work contracted for will be finished in another year. This splendid structure was expressly intended by the donors, the Misses Walker, to be a gift to the city quite as much as to the Anglican Episcopal Church of Scotland; and circumstances have arisen, as has been the case with other such legacies, which have greatly enhanced its value as an architectural ornament to the city. The trustees found it necessary for cathedral uses to enlarge the area and otherwise complete its design as a cathedral church by addition of two western towers and spires. This addition, which considerably lengthens the nave, adds immensely to the complete and satisfactory proportion of the whole, by balancing somewhat the oppressive magnitude of the central tower and spire. Foundations occasioned an additional expenditure, and materials and labour had risen so enormously after the legacy was made, and the contract was taken, that when all is done the cost will not fall much, if any, below three times the sum originally left for the church, which was £40,000.

Space will not allow of more than a few notes as to the stage now reached in the construction. All walls but those of the choir have been roofed in, and the workmen are now finishing the east gable, in the apex of which St. Mary has been placed, although the statues for the four niches below are not yet fixed. The vaulting of the choir is being proceeded with; that of the nave aisles, which is quadripartite, with moulded stone ribs, has been completed in concrete, and the surface tinted rose colour. The spire rises but slowly, and is now about level of half the height of the corner pinnacles forming the octagon above the square. Gas piping has been laid, and the pendant brackets fixed on the clerestory. The main pipe is led directly up the western tower, and then runs along the clerestory, about level of the window-sills, in a 2in. iron pipe. The lights of the west front and clerestory have been glazed. The work, executed by Messrs. Kemp, of London, is partly in stained glass and partly in ordinary quarries, with double-narrow border of clear pale smoke-green tint. The stained-glass work fills only the south side of the clerestory. A deep green is the prevailing colour, with patches of brilliant orange, scarlet, blue, and gold, &c., as required in the heraldic insignia emblazoned, and which are all on a large scale as to size. The effect is nothing less than splendid in the sunlight, which gives at mid-day the glories of a mellow sunset to the roof, and lights up the whole with a light which must be called religious, and is anything but dim.

IRONWORK AT THE PARIS EXHIBITION.

MESSRS. BARNARD, BISHOP, and BARNARDS, of the Norfolk Ironworks, Norwich, and of Queen Victoria-street, E.C., have sent to the Paris Exhibition some admirable specimens of design and workmanship. In the "Brief Description of Exhibits" now before us, we find a pair of elaborate wrought-iron gates, which serve as the entrance to the pavilion of the Prince of Wales. These gates are delicate in workmanship, and have been left unpainted as they came from the forge. The scroll work between the uprights is out of the best Lowmoor and charcoal iron, and the rose, shamrock, and thistle are beautifully wrought as ornaments, every tendril and leaf being cut and bent by hand, and in no case has the use of a stamp or matrix been resorted to. Another simple design in a style of the 17th century is shown. In a similar style we note a well-designed stove or fire basket, with handirons, also intended for the entrance-hall of the Prince's pavilion. It is of cast iron, with fire-brick lining, and electro-bronzed ornament, the andirons being of polished brass. One of the principal contributions of this firm consists in an ornamental pavilion of two floors, intended for use upon a lawn, mounted upon a dais. On plan it is oblong, 35ft. × 18ft. The shafts or columns supporting the structure are very diverse in ornament of a Japanese character, and the verandah is carried by a series of cast-iron brackets of sensible form, their spandrels all being different in design. These consist in bas-reliefs of conventionalised foliage and animal life. Thus we have studies from the apple blossom, with flying birds, white-thorn and pheasants, Scotch fir, sunflower, chrysanthemum, narcissus, daisy, and grass, with a crane and rising lark, &c. A cresting of fans surrounds the edge of the lower verandah roof, and each of these ornaments illustrates some flower. The upper floor has a balcony, with railing in correct design, showing how much may be done by rectilinear features. The upper roof is carried by another series of supports connected by a transom-bar, from which large and elaborate brackets of varied design spring, and carry the upper curved zinc roof. The details of columns are interesting, as indicating quite a Japanese kind of ornamentation, in which types of floral ornament have been introduced in the lower portions of each face. Another novel feature is the cast-iron panelled ceiling to the upper and lower stories, with bas-relief ornamentation stamped upon it; and we understand the South Kensington authorities have purchased portions of the pavilion as illustrative of artistic wrought and cast-iron work of the 19th century. The sunflower railing divided into 72 panels surrounding the pavilion is a masterpiece of wrought-iron work. The pavilion and details were designed by Mr. T. Jeckyll, of St. George-terrace, Queen's-gate. We may mention also some very clever art castings or fronts to slow-combustion stoves, in which a Japanese kind of surface ornamentation in low relief, with medallions filled with types from flowers and birds, is used. The effect of this kind of ornamentation is good, and exceedingly appropriate as surface decoration to metal. The exhibits of Messrs. Barnard, Bishop, and Barnards are certainly above the average, and indicate considerable advance in the correct principles of metal-work design.

TRAMWAYS IN TOWN AND COUNTRY.*

IN a small pamphlet reprinted from Mr. Ewing Mattheson's "Aid Book to Engineering Enterprise Abroad," we have a concise statement of particulars bearing upon tramways, which, at the present time, may be of service in assisting town authorities and engineers to judge of the advantages and disadvantages of steam tramways. Several towns have lately applied for powers to lay down tramways, and the expenditure seems to be the main obstacle in the way. Our readers are aware that steam cars of various forms have been lately tested, and many experiments have taken place in London, which have proved that the three main objections to steam on highways can be removed—namely, the nuisance of the smoke, the frightening of horses, and the controlling of the engine. Economically considered, the substitution of steam for horse-cars will make a saving of fully 30 per cent., the greatest economy being obtained where extensive traffic necessitates the use of large cars. Every car-driver knows that the repeated stoppages and startings of the car are most injurious to the horses in the course of time through the severe strains upon them. Where the gradients are steep the use of horse power is still more disadvantageous and uneconomical, and is a further inducement for the change. There are two kinds of steam cars; in one the engine is combined with the car, and shut off from the passengers by a partition; in other cases there is a separate locomotive car boxed in, and used for pulling the passenger car. Mr. Matheson enumerates certain advantages in each. The first occupies less space in the street, and the weight of passengers adds to the adhesive weight of the engine wheels for overcoming gradients; the second kind has the advantage of separating the engine and boiler from the passengers, and can be detached for repairs; on the other hand, it would require loading to give sufficient adhesion to the wheels. On slight gradients a weight of at least 6 tons on the driving-wheels has been found necessary. On the whole there are evident advantages in combining the engine with the car, as such self-contained cars can be increased to any length to carry as many as 60 passengers, and the labour of driver and conductor be thus more profitably employed. Only a trial will prove the advantages of each method. The self-contained cars, for 40 to 60 passengers, weigh from 6 to 10 tons, and cost from £800 to £1,200, while the separate locomotives weigh from 4 to 8 tons, and cost from £550 to £900. With regard to the difference in the capital outlay between horses and steam there is not much, and this will depend mainly on local peculiarities, the respective cost of horses and coal and the kind of gradients. It has been calculated that every stoppage entails an expenditure of fuel that would be equal to half a mile of haulage, and it therefore is a consideration of some moment that certain stations or points of stopping should be agreed upon. Numerous kinds of car are at present in use. In Hamburg and Copenhagen two-storied cars are constructed like those on the suburban railways of Paris. The cover of the outside seats is sometimes made removable, so that they can be open in the summer. Awnings are also used in hot countries like India, South America, and Italy, and in some cases louvre blinds (*persiennes*) are fitted to the windows. An open form of car in summer time might be employed in this country with much advantage, such as those used in southern climates, where the cars are covered by a roof only, with projecting eaves, and the seats protected from the sun by curtains. In the open cars the seats are sometimes placed transversely *vis-à-vis*. Even the architect might turn his attention to car design.

Some useful statistics are given by the author, from which we gather a few facts. In London a two-horse car, running 70 miles per day, usually requires 10 horses, or an average of 14 miles of work per day, though 11 horses are provided to allow for rests. How often this number of horses is provided in the London services it would be difficult to say, though they are worked often as much as 20 miles per day, and even more. The working life of tramway horses is put at something less than that of omnibus horses or about 3½ to 4 years, while the General Omnibus Company have, it is said, raised the working life of the animals from 3½ to 5 years. The horsing and working of two-horse cars in England is put down at about 9d. per mile, including charges for forage, shoeing, harness, and renewals, and all working expenses. A maximum speed of ten miles an hour has been tried, and it has been found that cars travelling at that speed can be stopped within half their own length. We have no space to mention other points that are alluded to in Mr. Matheson's little book; but to those who are in quest of a handy treatise on the subject, giving particulars of what has been accomplished, with useful suggestions bearing upon the engineering, municipal, and financial aspects of the scheme. We are glad to be able to recommend the present work.

* Tramways in Town and Country. By EWING MATHESON, M.I.C.E. London: E. and F. N. Spon, Charing-cross.

One of the latest projects for the embellishment of the Thames Embankment is a scheme for erecting thereon a Scotch church, at a cost of £60,000.

Messrs. Burt and Bevan were elected on Monday week Sheriffs of London and Middlesex for the ensuing year. Mr. Burt is a member of the firm of Mowlem, Burt, and Freeman, contractors.

A new schoolroom with class-rooms have been erected at the rear of the Wesleyan chapel at Looe, and were opened on Thursday in last week. They were built by Messrs. W. Shapcott and J. Angear, from the plans of Mr. J. Paul, of Plymouth, at a cost of £380.

A portrait of Mr. W. E. Gladstone, formerly student, painted by Mr. G. F. Watts, R.A., has been exhibited in the hall of Christ Church, Oxford, where it will find a permanent place. It is described as a vigorous and truthful likeness.

Mr. C. J. Neale, architect, has been requested to report on the Mechanics' Institute, Mansfield, and to prepare plans for its extension.

The vestry of Bethnal-green, on the 20th ult., adopted plans prepared by their surveyor for the erection in that part of the parish churchyard, immediately opposite the vestry hall, of a mortuary, at an estimated cost of £1,650, exclusive of furniture and vehicles.

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ILLUSTRATIONS.

COURTYARD OF RIVERSIDE HOTEL AT GREAT MARLOW—HOUSE AT HARROW—OLD HOUSES AT LISIEUX AND CAUDEBEC—PROPOSED CHURCH OF ST. PETER AT MOTTINGHAM—NEW OFFICES OF THE PRUDENTIAL ASSURANCE CO.

OUR LITHOGRAPHIC ILLUSTRATIONS.

COURTYARD OF A RIVERSIDE HOTEL, GREAT MARLOW.

THE site of the proposed building, which we illustrate from the drawing now on view at the Royal Academy, is upon the banks of the Thames, and the principal floors of the river front are occupied chiefly by private sitting rooms, having access to balconies, and shaded by verandahs. The lower story will be faced in red brick, and the upper portion rough cast on brick; the roofs will be tiled. The materials proposed to be employed, and the entire treatment of the building, are intended to be of the plainest and simplest description. The architect is Mr. W. H. Powell.

HOUSES, LISIEUX AND CAUDEBEC.

THESE are sketches of the ordinary types of the old domestic timber work found so plentifully in many of the Norman towns. The house at Lisieux encloses three sides of an inner court, with an external stair to upper rooms. The beams are enriched with well-executed carving. That at Caudebec is one of a whole street of ancient dwellings, few of which, however, possess any detail other than the mouldings to the massive beams carrying front.—W. PENSTONE.

NEW BOARDING-HOUSE, HARROW SCHOOL.

THIS is an addition to one of the master's houses, which was lately occupied by the Rev. R. Middlemist, and now belongs to the Rev. J. A. Cruikshank. The new building contains a kitchen, scullery, and other offices on the ground and first floors. On the second floor is a large dining-hall for the boys, which, owing to the fall of the ground, is level with the road running behind the house, and between it and the churchyard. In the third floor are bedrooms and a sick-room, with a nurses' room attached for cases of illness not serious enough to require removal to the school hospital. Rooms are provided on the two upper floors, which can be used either as studies, for improving the boys' accommodation, or for other purposes. The architect is Mr. T. G. Jackson.

NEW OFFICES FOR THE PRUDENTIAL ASSURANCE COMPANY.

IN Vol. X. of the BUILDING NEWS, p. 239 (March 27, 1863), we illustrated the present premises of the Prudential Assurance Company on Ludgate-hill, which were erected from the designs of Mr. R. L. Roumieu. In our description of that building we gave a few figures illustrating the rapid progress of the company during the preceding five years; but those figures, though respectable enough in themselves, are insignificant compared with the sums which represent the present transactions of the office. The premises on Ludgate-hill have for some time been inadequate (we are informed that no less than 500 clerks are employed by the company), and Mr. Alfred Waterhouse, A.R.A., some time since, received instructions to build the imposing structure now approaching completion at the corner of Brook-street, in Holborn. The building is a successful example of the adaptation of terra cotta, and next week, when we shall give further illustrations, we hope to append a few particulars respecting its construction.

CHURCH OF ST. PETER, MOTTINGHAM.

THIS new church, which it is proposed to erect at Mottingham, is from the designs of Mr. Edward F. C. Clarke, architect, of Serjeants'-inn. Our illustration is taken from the drawing now on view at the Royal Academy. We give a plan of the ground floor, which shows a cross church having double transepts with choir aisles, the south side being used for an organ. A rather novel and picturesque feature is made of the staircase and bell-turret with the porch under. Red brick is intended for the walling, and tiles for the roof.

THE POPULAR DICTIONARY OF ARCHITECTURE.*

THE third part of Messrs. Audsley's "Dictionary of Architecture" is before us, and we may say it fully sustains the character we gave it when the first number was issued. Part III. carries us from "Andronitis or Andron," to the article "Animal." The term "angel," as applied to conventional representations in Christian art, is exhaustively treated; indeed, Messrs. Audsley, in this branch of their encyclopædic labour are clearly at home. The various attributes artists have employed are described. One remark is worth quoting: "Angels do not appear in the works of art which were executed during the first six centuries of the Church, and previous to the fifth century they were, as far as we can learn from existing examples, invariably represented without the nimbus—that attribute of divinity with which they were invested throughout the entire range of middle-age art. The nimbi given to all the orders of the angelic hierarchy are circular in form with their fields either plain or covered with numerous radiating lines or rays." It is to be noted, however, that, in the Italian art of the 13th and 14th centuries, angels are sometimes found without the nimbus. The white vesture spoken of by St. Matthew and St. John resembling the Classic tunica and pallium was generally employed, though the vesture became richer as the Church increased in wealth. In the 14th, 15th, and 16th centuries we find angels, as Pugin observes, vested in copes, chasubles, and dalmatics, also in apparelled albs and stoles. The celestial hierarchy, as classified by Dionysius the Areopagite, is given, also the arrangement of St. Gregory and St. Bernard, who make the complete hierarchy to consist of 3 orders. The first include Seraphim, Cherubim, Thrones; the second Dominations, Principalities, and Powers; and the third Virtues, Archangels, Angels. We find the compilers have had recourse to some of the best authorities on this subject, such as "Manuel d'Iconographie Chrétienne," D'Agencourt's "History of Art," Viollet-le-Duc, and to Mr. C. R. Cockerell's paper on the fine series of angels in the retro-choir of Lincoln Cathedral known as the "Angel Choir," published by the Archæological Institute. Articles on "Angle-buttress" and "Angle-column" are perhaps rather scanty. The Greek practice is not spoken of. "Angle-leaf" is well illustrated from types from Sens, Naumburg, Chartres, Rochester, &c. "Anglo-Saxon Architecture" is exhaustively treated. In the article "Angular Shaft," the different forms of shaft are not so distinguished as they might have been, and "Willis's Nomenclature" might have been consulted to advantage. So carefully compiled a dictionary should have excellent wood engravings. Those given, though accurate in all essentials, rather lack spirit and life, and we should like to see a little more point given to them.

THE ARCHITECTURAL ASSOCIATION'S EXCURSION.

THE ninth annual excursion of the Architectural Association is arranged to take place during the second week in August (12th to 19th). A very attractive district, South-east Yorkshire, is to be visited, the headquarters being Hull, and under the leadership of Mr. James Fowler, of Louth, a pleasant week's sketching may be anticipated. The right bank of the Humber is rich in a series of cathedral-like parochial churches of a bold type of Late Decorated and Third Transitional architecture, square-built and broad, with massive towers. Their details and mouldings are generally florid and occasionally vigorous and free, but the suggestive characteristics of these churches will probably be found in good proportions rather than in ornamentation. The sketch programme shows that a heavy week's work is mapped out. Monday, a carriage day, includes visits to Burton, Pidsea, Aldborough Church, with its interesting 14th century monuments, the fine Perpendicular church of Shirlaugh, and that of Swine, built into the remains of St. Mary's Priory; the nave is a Transitional Norman structure. Tuesday, a rail journey to the Early English cruciform church at Cottingham, and the magnificent minster of Beverley, second only to York in the buildings of this county of great churches, for grandeur of proportion and exquisite detail. Beverley minster must not absorb attention to the exclusion of St. Mary's—a noble if second-rate edifice—while the North Bar, tempo. Edward III., is worthy attention. On Wednesday the members will go by carriage to another cruciform church—that of Hedon—and thence to Keyingham, Ottringham, and Patrington—the last named, a 14th century building, having octagonal central tower and spire. On Thursday the great abbey church of Selby, and the partly-ruined collegiate church of Howden will repay all the study that can be bestowed upon them. The next day is to be spent on the Lincolnshire side of the water at Barton-on-Humber, Thornton Abbey, and Thornton Curtis. Saturday will be passed in comparative quiet at headquarters. The busy and cramped port of Kingston-upon-Hull has attractions of its own in a few ancient quaint houses squeezed into oddly-named byeways, and in Holy Trinity and St. Mary's churches, both restored by the late Sir Gilbert Scott—the former a capacious cruciform structure, with fine pinnacled central tower.

* The Popular Dictionary of Architecture. By W. J. and G. A. AUDSLEY Fellows R.I.B.A. Liverpool: Published by Authors.

COMPETITIONS.

ASTON.—The designs submitted on the 1st of last month, in competition for the new public offices for Aston Local Board, near Birmingham, have not yet been opened. Mr. Alfred Waterhouse, A.R.A., has, however, been appointed professional referee, but it is not expected that the matter will be gone into till the middle of next month, on account of the referee's prior engagements.

LLANDUDNO.—Nineteen designs have been received by the Llandudno School Board in response to an offered premium of £10. The proposed expenditure, including cost of site, is £4,000.

It was reported at the Surrey midsummer quarter sessions that the county surveyor had prepared and submitted a preliminary sketch of the proposed new asylum to be erected on the site lately acquired at Coulsdon. The sketch has been approved by the Lunacy Commissioners, subject to slight alteration, and it will, therefore, be carried out. Messrs. Docura and Son are sinking a well on the site under a schedule of prices at 10 per cent. profit on outlay.

The Horsham Local Board accepted, on Friday last, the tender of Mr. J. Dickson for the execution of drainage works, amounting to £7,950.

The heavy work in connection with the great central tower of St. Finn Barre's Cathedral, Cork, preparatory to raising the tower proper, have just been completed in accordance with Mr. Burges's plans. The great arches have been turned, and the floor above laid, and a large quantity of wrought material is on the ground, so that the massive tower will soon rise from the crossing.

The Midland Counties Art Museum at Nottingham Castle was formally opened on Wednesday by the Prince and Princess of Wales.

The question of increasing the water supply of Hull has been reported upon to the Corporation by Mr. J. Bateman, C.E., who suggests a plan for extending the works at Springhead, which he considers could be carried out for £100,000 actual outlay. The matter is under consideration by a committee, and in the meantime Deacon's waste water detectors are to be applied to the mains at various points.

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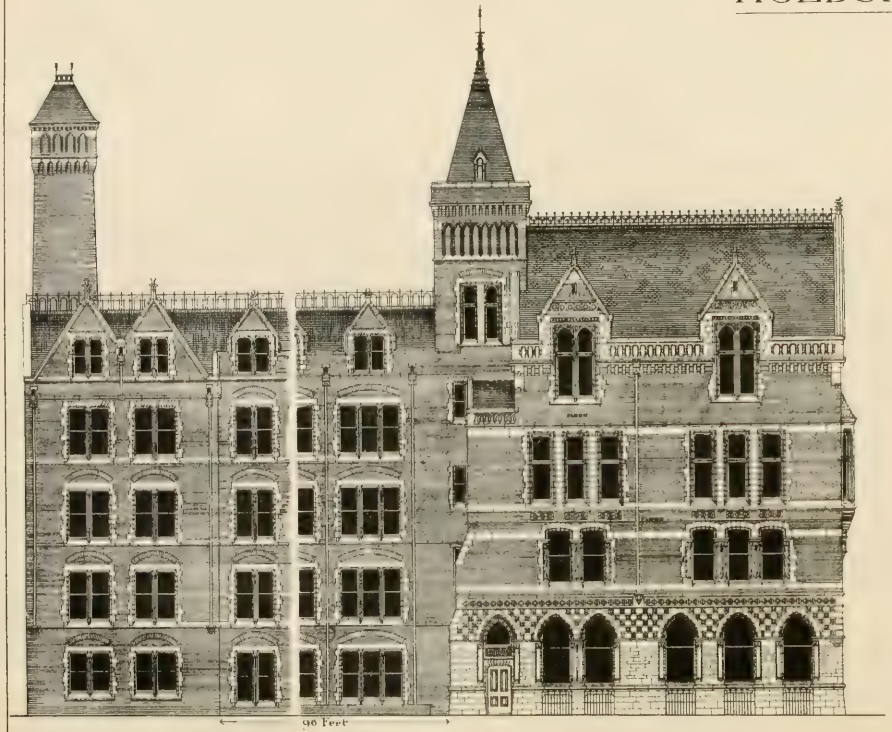
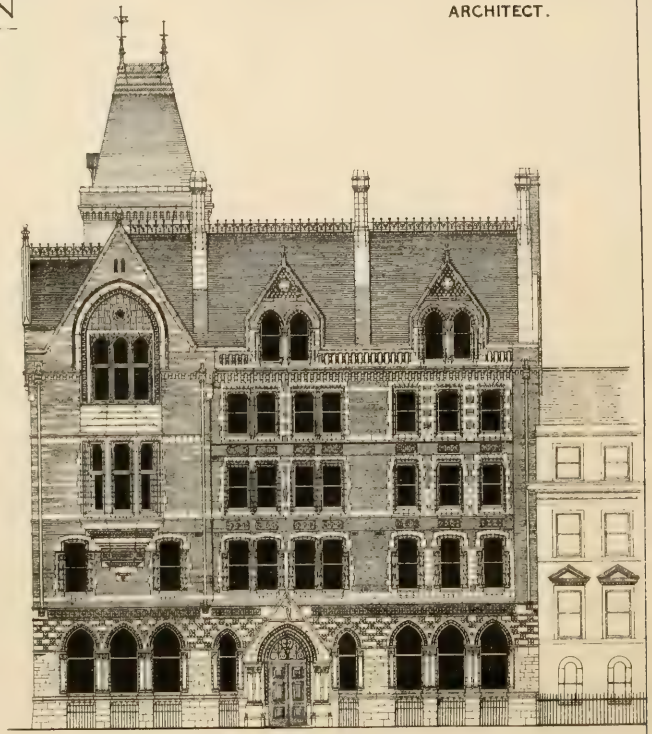
HOLBORN

Alfred Waterhouse A·R·A·
ARCHITECT.



Brooke · Street · Front ·

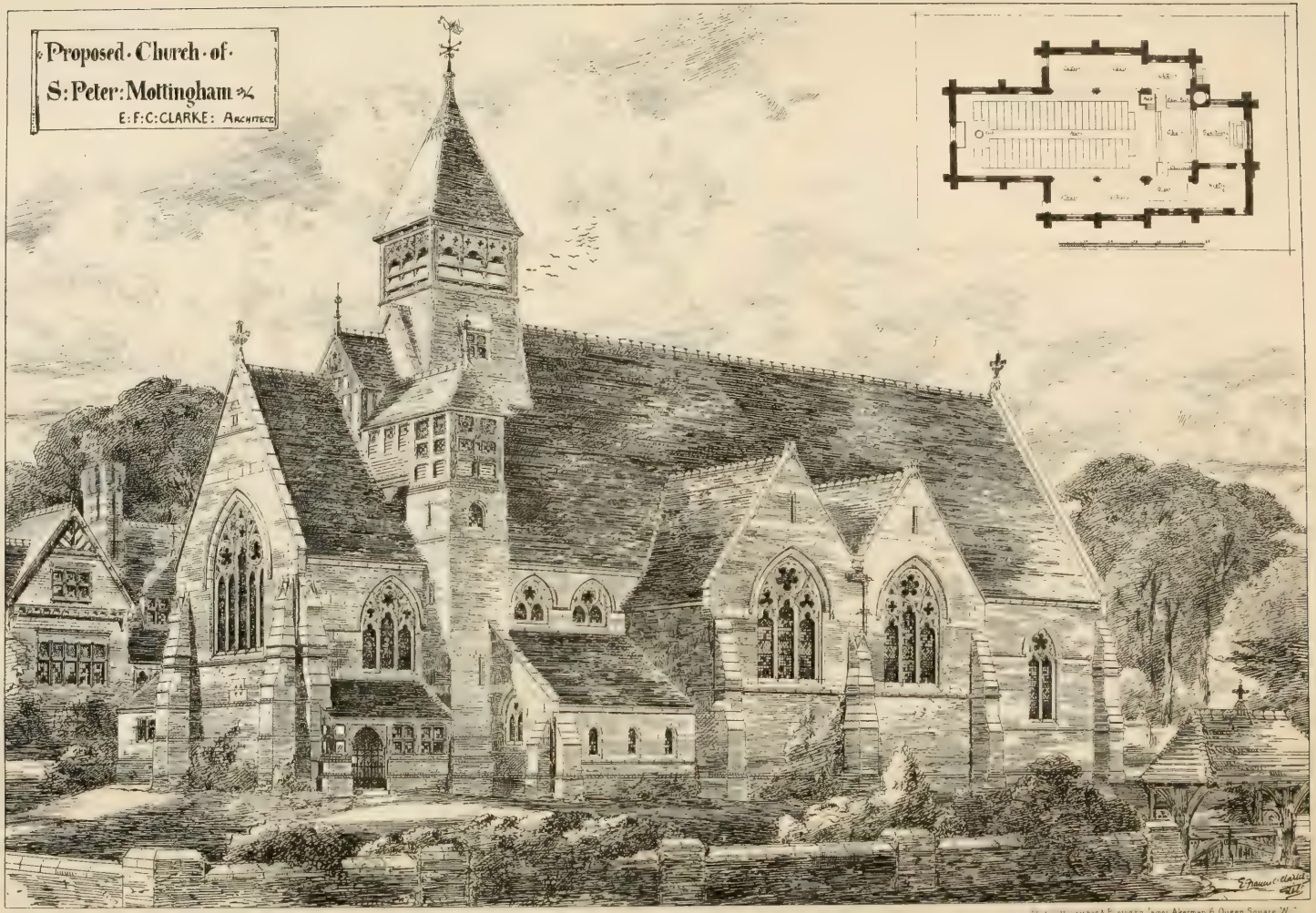


Holborn · Front ·

Scale of Feet

MAURICE B. ADAMS DEL.

Drawn, Lithographed & Printed by James Akerman, 6 Queen Square W.C.



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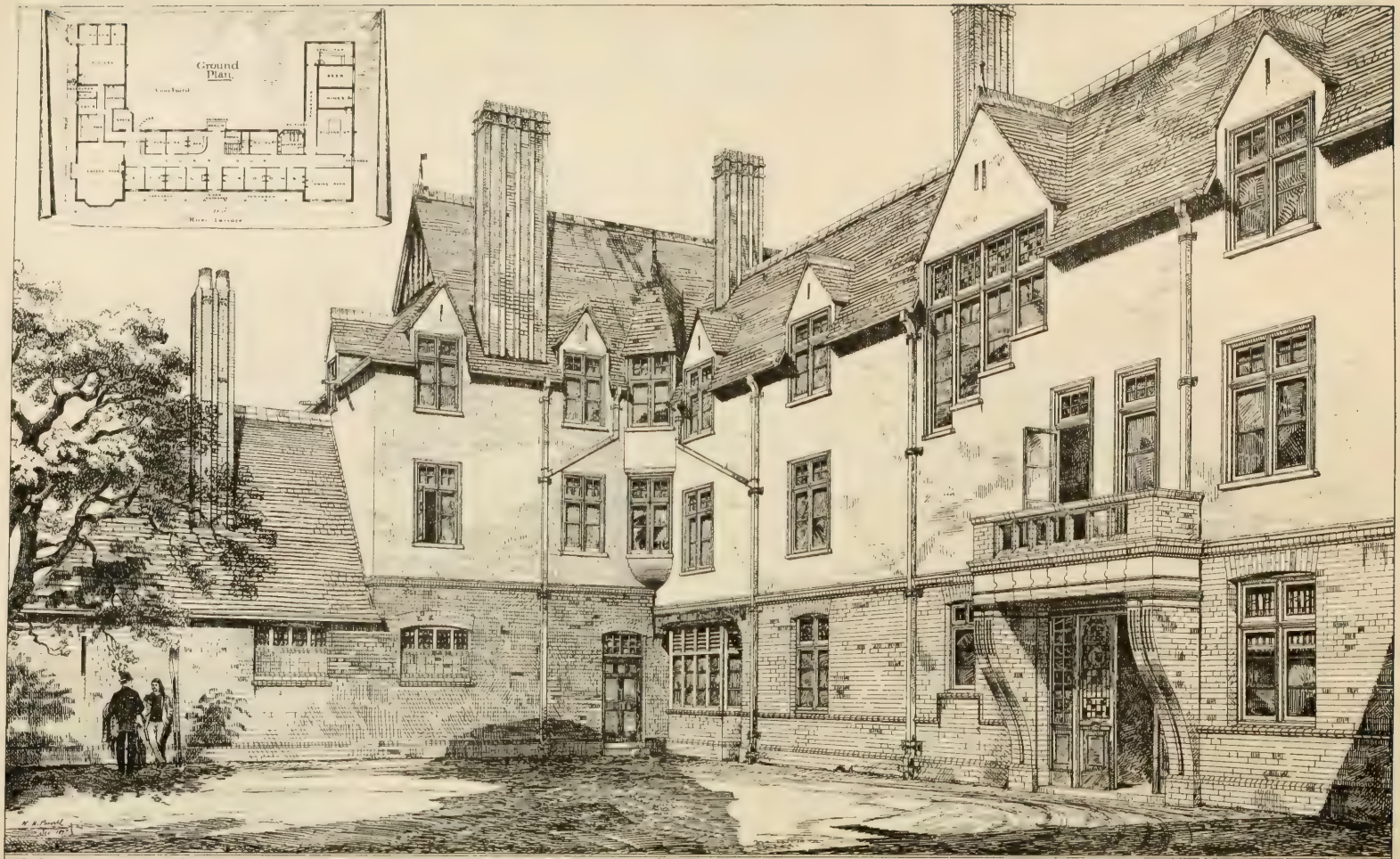


View in the Courtyard of a Riverside HOTEL now being built for Col. Owen Williams at GREAT-MARLOW W.H. Lovell ARIBA. Archt.

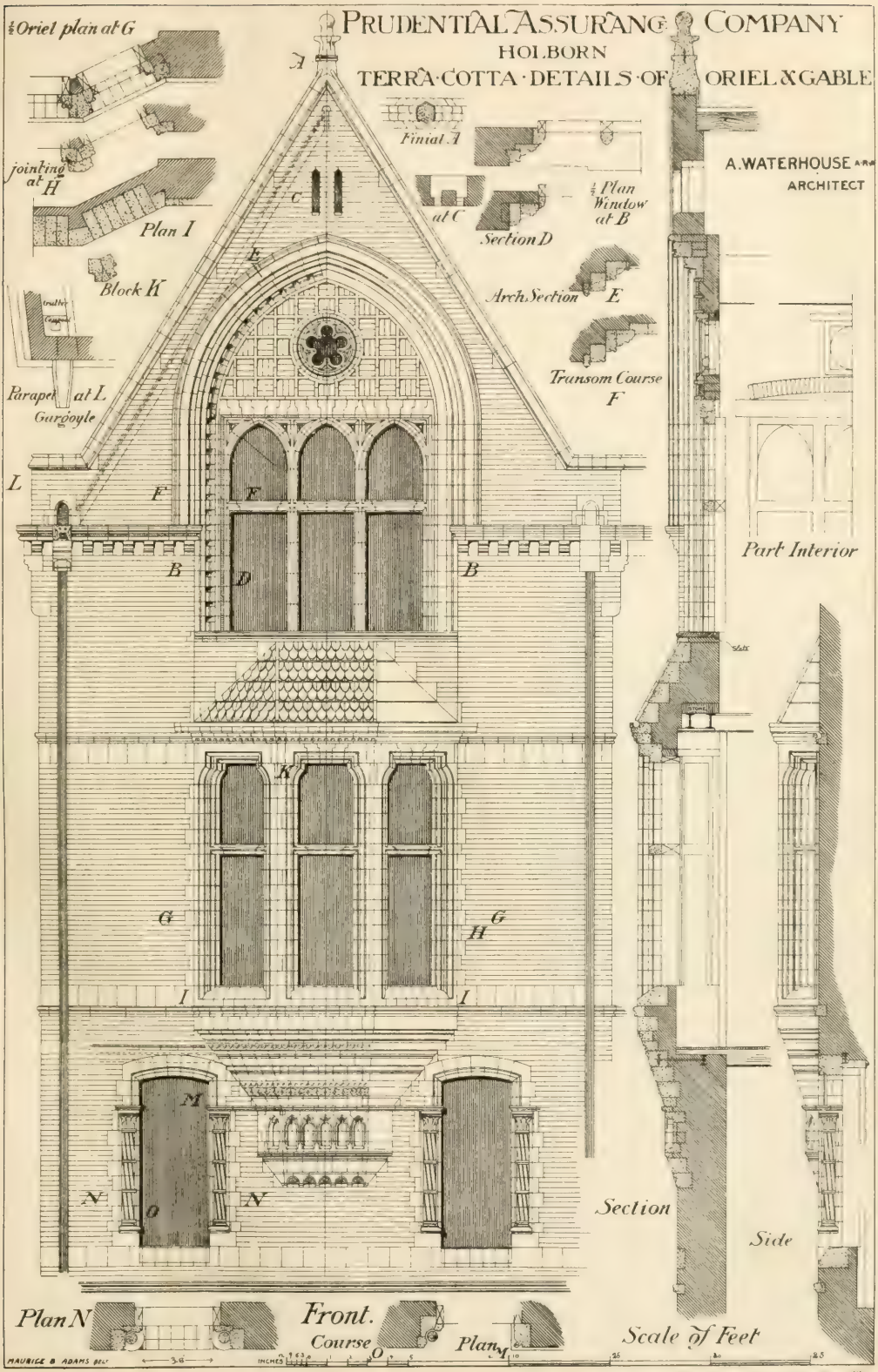
Photo-Lithographed & Printed by James Akerman, 6 Queen Square W.C.

House at Harrow · T. G. Jackson Archt.

Akermann Photo lith. London

House Rue d'Orville Lisieux

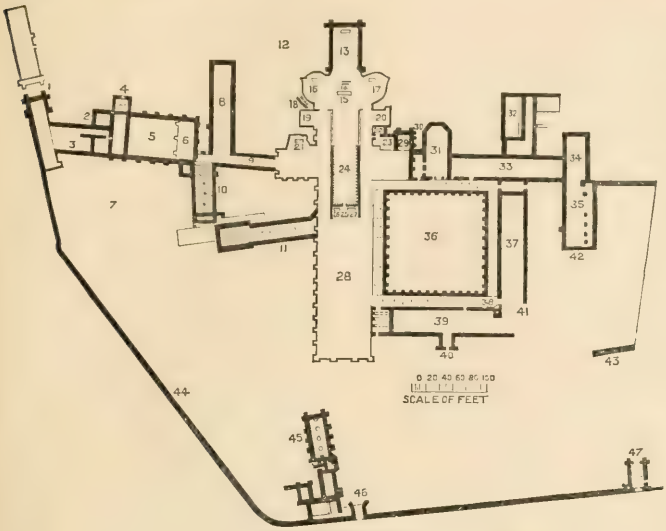
W. Caudebec


PRUDENTIAL ASSURANCE COMPANY
HOLBORN
TERRA-COTTA · DETAILS · OF ORIEL & GABLE
A. WATERHOUSE ARCH
ARCHITECT
½ Oriel plan at G
jointing at H
Plan I
Block K
Parapet at L
Gargoyle
Finial A
at C
½ Plan Window at B
Section D
Arch Section E
Transom Course F
Part Interior
Section
Side
Plan N
Front.
Course O
Plan M
Scale of Feet
MAURICE B. ADAMS DEL.

GROUND PLANS OF NORWICH AND PETERBOROUGH CATHEDRALS.

THE innumerable changes, destructions, and "restorations" in our great churches within the last twenty years have removed many interesting buildings and internal features. I avoid any allusion in detail to this "burning question," or vain regret for irreparable losses. With the assistance of the MS. ground plans by the Rev. David J. Stewart, the author of an admirable article on Norwich cloisters, and an exhaustive history of Ely; with hints from Blomefield, Lestrange, and Browne Willis, I give the ichnography of two of the finest East Anglian cathedrals before many of their ancient accessories had been swept away.

Your crowded pages permit me only to draw attention to some of the most salient peculiarities which present themselves to the consideration of the archæologist.



NORWICH MONASTERY.

PETERBOROUGH MONASTERY (BENEDICTINE).

NORWICH.

The east end formerly presented a group of chapels of various dates. On the east side of the transept in the south wing were the sacristy, St. George's, or the Wakering chapel, and Heyden's chapel. Above the latter was an anchorite's cell with a grated window, which commanded a view of the high altar. On the north side of the presbytery aisle were other chapels, which are mentioned soon after the Reformation in connection with the sanctuary men's chamber built in 1404 upon a vault, and afterwards occupied by two chantry priests, and two adjoining chapels of St. Andrew and St. Anne, the latter called also Berney's chapel, and misplaced on Blomefield's plan. The stairs leading to it were fixed to the west wall of the Jesus Chapel. At Christchurch, Hants, there are two internal turret staircases leading to St. Michael's loft above the Lady Chapel. In 1554 the chapels were shut off from the cathedral, and with the chamber converted into a house. A bridge or gallery still remaining communicated with the south presbytery aisle.

The double chapels at the sides of the central apse are of remarkable form. The high altar stood in the chord of the apse, and behind, according to the basilican arrangement, was the bishop's throne, as at Canterbury. The choir was continued westward into the nave, and the stalls occupied also the whole space under the tower.

The bishop's palace was exceptionally extensive, and covered a large space of ground. Three chapels might be traced within its compass.

The infirmary stood in the same relative position to the refectory and dormitory as at Gloucester, and had the peculiarity of having only one aisle to the hall. I have found one parallel instance in the Cistercian Abbey of Buildwas.

The guest-house occupied the west side of the cloister, thus resembling the cellarers' hall at Canterbury. The lavatories were in the west wall of the adjoining alley, as at Westminster, and in the Austin Canons' house at Kirkham.

The gong held the same position as it did in the Cistercian Abbey of Netley and the Cluniac Priory of Lewes.

The parlour corresponded in its site with that of Durham.

The chapter-house exceptionally had a three-sided apse, and there was at Durham a round eastern end, for with rare exceptions (as at Worcester and Westminster) the Benedictines built oblong chambers.

The two gate-houses for the church and court have their parallels at Bury St. Edmund's, the Cathedral and St. Augustine's, Canterbury, and on a smaller scale at Gloucester. At Winchester and Rochester there were similar arrangements.

A charnel chapel adjoined the west front at Winchester and Worcester, and probably the chapel in the Church-court at Peterborough served the same pious use.

REFERENCES.

1. Gate House.
2. Buttery.
3. Kitchen.
4. Porch.
5. Hall.
6. Chapel.
7. Palace.
8. Old Chapel.
9. Entry.
10. 2nd Chapel.
11. Norman Entry.
12. Gardens.
13. Lady Chapel.
14. Throne.
15. High Altar.
16. Jesus Chapel.
17. St. Luke's Chapel.
18. Stairs to Sanctuary —Men's Chamber.
19. St. Andrew's Chapel.
20. Beauchamp Chapel.
21. St. Anne's Chapel.
22. Heydon's Chapel.
23. St. George's Chapel.
24. Monks' Choir.
25. Rood Loft.
26. Altar of Our Lady of Pity.
27. Altar of St. Thomas.
28. Nave.
29. Sacristy.
30. Parlour.
31. Chapter House.
32. Gong.
33. Dormitory (over).
34. Chapel.
35. Hall.
36. Cloister Garth.
37. Refectory.
38. Lavatory.
39. Guest House.
40. Porch.
41. Kitchen.
42. Infirmary.
43. Library.
44. Precinct Wall.
45. Charnel Chapel.
46. Church Gate.
47. Court Gate.

PETERBOROUGH,

I have recently spoken of in the BUILDING NEWS. The present is an enlarged and much fuller plan. As in the case of Norwich, many buildings delineated in it have of late years been swept away. The day probably is not far distant when some attempt will be made to revise the screen and stall-work, which were highly creditable to their designers at the very recent time when they were erected, but now urgently demand a total reconstruction in the County of Fair Churches, and in a church of superb dimensions, but with a nave cold and bare, and a choir filled with furniture at least laggard among its fellows in the work of true and necessary restoration on the old lines.

REFERENCES.

1. New Work.
2. Reredos.
3. Screens.
4. High Altar.
5. Entry.
6. Lady Chapel.
7. Door.
8. St. James's Chapel.
9. St. John's Chapel.
10. St. Oswald's Chapel.
11. St. Benedict's Chapel.
12. SS. Kyneburga and Kyneswithas' Cha.
13. Monks' Choir.
14. Sacristy.
15. Choir Screen and Entry.
16. Rood Loft.
17. Nave.
18. Entry to Cemetery.
19. Prior's Gate.
20. Church Court.
21. Abbot's Gatehouse.
22. Chapel.
23. Church Gatehouse.
24. Processional Door.
25. " "
26. Slype.
27. Parlour.
28. Chapter House.
29. Porch.
30. Dormitory (over).
31. Cloister Garth.
32. Lavatories.
33. Refectory.
34. Dark Entry.
35. Gong.
36. Kitchen.
37. Abbot's Lodge.
38. Prior's Lodge.
39. Infirmarer's Hall.
40. Chapel of St. Lawrence.
41. Chancel.
42. Nave.
43. Hall.
44. Infirmary.
45. Precinct Wall.

MACKENZIE E. C. WALCOTT.

The Bristol Master Builders' Association held their annual outing and dinner on Tuesday.

The 24th annual excursion of the Brighton and Sussex Natural History Society took place on Friday last, and was paid to Chichester, the cathedral and museum being visited and inspected.

The Blackburn Town Council last week accepted the tender of Mr. James Whittaker at £5,896, out of 21 received, for the erection of additional municipal offices in the market-place. The front elevations are to be of stone, with Yorkshire parpoints and granite columns, up to first-floor, and above that of brick with stone dressings. The style is Gothic. Warming is by open fireplaces, and ventilation by Conryn's, and Ching's and Tobin's apparatus. The floors will be fireproof on Dennett's principle.

The Norwich School Board have instructed Mr. Brown, their architect, to prepare plans for a board school for 900 children, capable of future enlargement, to be erected in Crook's-place.

The parish church of St. Nicholas, Oakley, near Eye, Suffolk, has been restored and rebenched in oak, under the superintendence of Mr. J. K. Colling, architect.

During the past month excavations have been made into a camp at Binchester, a mile to the north of Bishop Auckland, with the result of bringing to light the ancient vallum of coursed masonry, 5ft. in height, pottery and burnt earth, coins, and human bones. The investigations are being continued. The site was known by the Romans as Vinovium.

A new Roman Catholic church, dedicated to St. Joseph, was opened at Wigan on Sunday. It is 87ft. by 60ft. 6in., and accommodates 1,000 persons at a cost, for erection, of £7,000.

The fine fourteenth-century timber porch and door at Copford Church, near Colchester, are about to be restored under the superintendence of Messrs. Ebbetts and Cobb, of Essex-street, Strand, from whose designs a new pedestal of Bleu Unis marble, with shafts of Sienna marble, has just been placed under the Norman font in the church, in place of a plain stone column. The work to the font was carried out by Messrs. Cox and Sons, of Southampton-street, Strand.

Extensive business premises, known as London House in Patrick-street, Cork city, are being rebuilt (after destruction by fire) from the plans of Mr. W. H. Hill, architect, by Mr Longfield, contractor. The foundation stone was laid on Friday last.

The restoration of Chastleton Church, Oxon, was commenced last week. Mr. C. E. Powell, of Rolls Chambers, Chancery-lane, E.C., is the architect, and Mr. Alfred Groves, of Milton-under-Wychwood, Oxon, the contractor.

Building Intelligence.

EAST HADDON.—East Haddon parish church, the interior of which has undergone restoration, was recently re-opened. The tower arch has been opened, and the interior of the tower, together with the pier arches, chancel arch, and windows cleaned, so as to expose the native stone, while in the south aisle the old wooden lintels over the windows have been replaced by stone. The east window has been restored, and a new stone arch and jambs have been introduced on the inside. It has been necessary to add a new organ-chamber on the north side of the chancel, the interior of which is stuccoed, like the walls of the other parts of the building, but the arch is of Bath stone, so that it matches the plaster; a yellow local stone having been used in the old work, which, had it been possible, would have been shown in its entirety. The floor has been relaid throughout, the old flagstones being used; but in the chancel, which rises a step from the nave, it is tiled, and within the sacrarium a pavement, with footpace, has been formed with Maw and Co.'s tiles. A new pulpit, in Caen stone, has been erected against the north wall of the nave, with an arched recess at the back, and the church has been re-seated throughout, so that it will accommodate about 300 persons. The whole of the work has been done by Mr. Robert Young, builder, of Lincoln, under the superintendence of Messrs. E. F. Law and Sons, architects, of Northampton. The cost is £1,750.

HAXBY. — The rebuilding of the parish church of Haxby, York, is approaching completion. Mr. Demaine, of York, is the architect, and the cost of the work will be £1,900. The inside length of the new building is 64ft., the nave being 46ft. × 25ft., and the chancel 18ft. × 17ft. The style adopted is Early Gothic. The outside walling is of stone from Rainton, near Thirsk, and the dressings are of Whitby stone. The inside walling is faced with Darlington white pressed bricks, and there are string-courses of red bricks at intervals and also above the windows. The height of the nave from the floor to the inside apex of the roof is 28ft., and that of the chancel is 24ft. At the east end of the church is a three-light window, to be filled in with stained glass by Messrs. Heaton, Butler, and Bayne.

HESSLE, NEAR HULL.—A new orphan home at Hessle, near Hull, will be opened in the course of a week or two, which is intended to accommodate 25 children, trained and educated for domestic service. The building has been erected for James Reckitt, Esq., of Mentone House. The home and cottage adjoining have been erected from the designs of Mr. William H. Thorp, architect, of St. Andrew's Chambers, Park-row, Leeds, and the work of supervision has been shared by Mr. W. H. Kitching, of Hull. The cost of the entire buildings, which are designed in the Queen Anne style, has been about £2,300, and they are built of white brick which has been obtained from the Lincolnshire side of the Humber, and stone dressings from the Ancaster Quarries. The staircase is filled with stained glass, supplied by Messrs. Powell and Co., of Park-place, Leeds. The mason's and bricklayer's work has been carried out by the firm of Messrs. Bentley and Burn, of Woodhouse, Leeds, and the carpenter's and joiner's work by Messrs. John Hall, Thorp, and Son, of Bowman-lane, Leeds.

LOFTUS-IN-CLEVELAND.—A building erected for the National Provincial Bank Company, by the Right Hon. the Earl of Zetland, was opened for the transaction of business on the 15th ult. The premises occupy a commanding site in the High-street, to which there is a frontage of 35ft. The ground floor contains the banking-room, 25ft. × 17ft., with manager's-room, strong-room, and lavatory adjoining. The first and second floors contain the necessary rooms for a manager's residence. The external walls are executed in dressed stonework from the quarries of Lord Zetland in the neighbourhood, and the principal woodwork is in pitch-pine varnished. Every credit is due for the efficient manner in which the work has been carried out by the various contractors engaged. The bank has been designed and carried out under the superintendence of Mr. Alfred J. Martin, architect, of Darlington, the style being that of the Early French Gothic period. Messrs. Farmer and Brindley, of London, executed the carving.

MANCHESTER.—An institution for the adult deaf and dumb has been erected in Grosvenor-street by Messrs. Robert Neill and Sons, at a cost of about £3,500, from the designs of Mr. J. Lowe, F.R.I.B.A., St. Ann's-square, Manchester, which were selected in competition. The principal elevation, fronting Grosvenor-street, is faced with Yorkshire stone, and is somewhat ornate. The building is designed in the First Pointed style of Gothic architecture, and internally is arranged in the basement as a gymnasium, and on the ground floor as a reading-room, coffee-room, secretary's office, class-room, and conveniences. The upper floor is devoted to a lecture-hall, with galleried floor; it is octagonal in plan, well lighted from the roof, and has a vestry and other requirements. The foundation stone was laid by Hugh Birley, Esq., M.P., on June 2nd, 1877, and the building was opened on the 8th ult., by the Lord Bishop of Manchester.

MAYFIELD.—The foundation stone of a new Free church has been laid at Mayfield, Edinburgh. The edifice is to be in the Early English style, simply treated, with some later Transitional detail. It is a large building, with nave, aisles, clerestory, and transepts. A tower and spire form part of the design, to be built hereafter. The arrangement of nave, aisles, &c., is peculiar, designed specially to present the characteristic features of the old Gothic hall, rather than the stereotyped form of the mediæval church, and the interior is intended to have all the advantages of one undivided auditorium. A gallery of moderate depth is thrown across the eastern end, over the vestibule. The seating is raised above passages, and will accommodate 850, but 50 additional occasional sittings are provided in the aisles, and the transepts have provisional capacity for 100 more, making a total of 1,000 sittings. The work is to be carried out from the selected competition plans of Messrs. Hardy and Wight, of Edinburgh, and the estimates accepted for the whole work, including boundary walls, are about £5,200.

METROPOLITAN BOARD OF WORKS.—At this board on Friday the works committee reported that they are considering the whole question of the floodings in various parts of the metropolis during the rainfall on April 10th and 11th last, and of storm-water overflows generally. Letters were ordered to be addressed to all persons who have asked for compensation denying the board's liability in respect of such floodings. Tenders are to be invited from six selected firms for providing additional pumps at Crossness pumping-station and the Effra and Falcon brook storm outlets—the works of fixing at the outlets to be executed by Messrs. Mowlem and Co. under their contract. Amongst the applications granted was one from Messrs. F. and H. Francis, asking consent to the erection of projecting overhanging bay windows to the Grand Hotel, Northumberland-avenue.

MORLEY.—A new Wesleyan chapel is being erected at Cross Hall, Morley. The chapel will be built of Morley or Finsdale stone. The front part of the side walls will be formed in regular courses of fine boasted wall stones, the rest of the walls being pitch-faced. The dressings will also be fine boasted throughout. The roof will be covered with Welsh viscountess slates. The chapel will accommodate 236 adults on the ground floor, and 112 in the gallery. The school adjoining will accommodate 150 scholars, thus making accommodation for about 500 persons. The total cost will be about £1,700, exclusive of land. The architect is Mr. George Mallinson, of Dewsbury.

OSBALDWICK.—The parish church of Osbaldwick, near York, has been re-opened after restoration from the designs of Mr. J. O. Scott, at a cost of £1,400. Mr. Dennison, of York, was the contractor. The internal fittings have been entirely removed, and the flooring laid down in concrete, and then paved with red and dark-blue tiles. The outer walls are of solid masonry. A new font of Caen stone, plain and Norman in character, has been fixed at the extremity of the north-west end of the nave. A new porch, similar in design to its predecessor,

has been erected at the south side of the nave, and the new oak doors have ornamental hinges and ironwork. On the north side of the chancel a new vestry has been built, and it has doorways—one leading into the church and the other into the churchyard. The west wall of the nave has been surmounted with a bell turret, extending to a height of 12ft. above the cresting of the roof, and in this turret is affixed two bells.

PURSTON.—The new church dedicated to St. Thomas, at Purston, near Pontefract, has just been consecrated. The style is 13th century Gothic. It consists of nave, side aisles, chancel, organ chapel, vestry, and porch. The nave is 71ft. by 26ft., making, with the aisles, a total width of 51ft. It is lighted by a lofty west window of three lancets, surmounted by a circular light 12ft. in diameter, also by the side aisle and clerestory windows. The arcade on either side of the nave is divided into four bays with their columns and responds. The chancel is 32ft. long by 23ft. 6in. wide, and on the north side are situated the organ, chapel, and vestry. The exterior of the church is of pitch-faced stones from Bracken-hill Quarries, and the dressings and ashlar generally have come from the same. The architect was Mr. T. Pollard, Bradford. The church will accommodate 550 worshippers. The cost has been over £6,000.

SALISBURY.—The memorial stones of a new Congregational church were laid in Fisherton, nearly opposite Salisbury Infirmary, on Wednesday week. The church is Early Decorated Gothic, and is planned with nave, aisles, and apse. At the south-west angle will be a tower and spire rising to a height of about 140ft.; at the north end are ministers' and deacons' vestries and organ chamber. The total length from apse to porch is 101ft. 6in., and the height from floor of nave to ceiling will be 43ft., and of aisles 172ft. The total cost, including site, is estimated at £8,000, and sittings will be provided for 600 adults on ground floor. The contract is being carried out by Mrs. Hale and Sons, of Salisbury, the foundations having been put in by Mr. Tryhorn, of the same city, from the designs and under the superintendence of Messrs. Tarring and Wilkinson, of London.

SHEFFIELD.—New Roman Catholic boys' schools, in Surrey-street, Sheffield, were opened on Tuesday week. The schools are designed to accommodate 400 boys; they are built of brick, with stone dressings, the roofs being covered with Broseley tiles. The design has been studied by the architects, Messrs. M. E. Hadfield and Son, on the model of the English architecture of the late Perpendicular or Tudor period.

ST. LAWRENCE, ESSEX.—St. Lawrence parish church, in the Dengie Hundred, was reopened on Wednesday after being entirely rebuilt. The former structure had fallen into great dilapidation, and the ancient chancel had been replaced some few years since by an ugly brick excrescence. The new church is erected on the old lines in the Perpendicular style, and consists of nave, 45ft. × 21ft.; chancel, 21ft. × 17ft.; vestry and north porch. The exterior is faced with Kentish rag in random courses, and the weatherings and dressings are of Bath stone, most of the old material being re-used. The roofs are covered with the old tiles and ornamental ridge cresting. The nave roof is surmounted by an oak octagonal turret, shingled, and rising 60ft. from ground to gridiron-vane. The nave windows are double light, and the chancel single light, the east and west ends being glazed in three and four lights respectively. The roofs are boarded with yellow deal, the constructional material being Baltic timber and pitch-pine. The chancel seats and pulpit are in wainscot; the nave seats are of yellow deal, stained and varnished. The floors are laid with Maw's encaustic tiles; the church is warmed by one of Rimington's hot-air stoves. The total cost has been £1,700. Mr. Robert Wheeler, of Tunbridge Wells, is the architect, and Mr. Stammers, of Southminster, the builder.

TEWKESBURY.—A new Wesleyan chapel was opened here on the 5th ult. by Dr. Pope, president of the Conference. The style is Gothic, of the 14th century, and the elevation consists of a gable containing a five-light window of rich design, flanked at the angles by octagonal buttresses, on the top of which are pinnacles springing from carved string-course. The interior is designed to seat 320 on the ground floor, with 50 more in a gallery above the entrance. No side galleries are contemplated. The cost is about £3,000. The architect is Mr. Charles Bell, of London, and the builder, Mr. Collins, of Tewkesbury, by whom the partial restoration of the abbey, under the late Sir Gilbert Scott, has been executed.

TEWKESBURY ABBEY.—At a meeting of the restoration committee, held on Friday week, an estimate for the restoration of the porch, and lowering the approach from the street, was accepted subject to the architect's approval. Mr. T. Gambier Parry announced that after carefully inspecting the roof of the nave, he was of opinion that, owing to the bosses being in a mutilated state, it would be better not to attempt to restore them. It was decided to consult the architect as to whether it would be expedient to leave the bosses as at present, and, if so, what should be done with the two bays already coloured. A suggestion to open the Clarence Vault for public inspection was also referred to the architect.

TONBRIDGE CHAPEL, EUSTON-ROAD, W.C.—This chapel, one of the largest and oldest in that part of London, has just been reopened after thorough restoration. The works have been carried out from the designs, and under the immediate superintendence of Mr. Henry Hall, architect, of 19, Doughty-street, Mecklenburg-square, W.C. The chapel is of the square old Congregational style, and of Classic design. The additions and alterations are in the same style freely treated. They embrace new windows throughout, these being glazed with semi-opaque cathedral tinted glass. The galleries have been taken down and re-erected at a more acute angle. Their fronts and seatings are all new. The old-fashioned pews in the body of the chapel have been removed, and the entire area is now reseated with open benches of approved modern style. The unsightly great lobby at the west end of the building has been cleared away, and smaller and more suitable ones substituted. All the woodwork throughout is of pitch pine and varnished. An arched recess moulded and carved has been sunk behind the pulpit, and the walls generally and the ceiling have been painted and coloured. The gas fittings are new, and, altogether, the building, which, prior to the restoration, had fallen into a lamentable state of decay, now presents a very creditable appearance. The contractor for the whole of the works was Mr. Harry Hems, Ecclesiastical Art Works, Exeter, the foreman of works being Mr. J. T. G. Berridge. About £1,000 has been expended.

TWYFORD.—The parish church of Twyford, Hants, has been rebuilt under the direction of Mr. A. Waterhouse, A.R.A., at a cost of £7,000. It consists of a nave and aisles, chancel, and south aisle, with two vestries on the north side of the chancel, and a tower and spire rising to the height of 110ft.; and is constructed throughout of flint, with red brick bands and Bath stone dressings, the roofs and the spire being covered with Broseley tiles. The builders are Messrs. J. H. and E. Dyer, of Alton.

WESTMINSTER.—The ancient and famous church of St. Margaret's, Westminster, was opened on Sunday, after complete restoration from designs by the late Sir Gilbert Scott. The galleries and high pews which blocked it up have been swept away; the space wasted by lobbies and passages has been thrown into the church; the organ has been moved from the west gallery to the north aisle; the west window has been opened, the tracery of all the clerestory windows, and of as many of the windows in the aisles as funds permitted, has been restored to its original condition from the mean tracery by which it had been disfigured. The plaster ceiling has been replaced by one of solid oak; a reredos has been erected, and the old false apse of lath and plaster has been removed. The church has been repaved with tiles. An altar-cloth has been presented by Sir Walter and Lady James; a credence table of marble and alabaster by Sir Stafford Northcote, M.P.; and a fine eagle lectern by Mr. T. B. Vacher. Painted windows have been presented by Miss Wainwright and the family of the Messrs. Trollope.

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[We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.]

All letters should be addressed to the EDITOR, 31, TAVISTOCK-STREET, COVENT-GARDEN, W.C.

TO OUR READERS.—We shall feel obliged to any of our readers who will favour us with brief notes of works contemplated or in progress in the provinces.

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RECEIVED.—G. B. and L.—A. M.—W. M. and Co.—J. S. and T.—R. B.—F. S. H.—F. B.—C. F. T.—T. S. A.—S. A.—R. and S.—R. J. E.—J. E.—H. S. B. Co.—P. and G.—F. I. Co.—J. G. F. N.—J. C.—J. J. C. and Co.

DRAWINGS RECEIVED.—W. L. Vernon.—W. S. W.—J. L. H. Benstead.—C. P. E.—J. S. Quilter.—T. Mitchell.—Camm Bros.

W. P. BUCHAN. (There is little good to be derived from a continuation of the controversy.)—A. L. BRADBEER. (The *English Mechanic and World of Science*, 2d., the *Engineer*, 6d., *Engineering*, 6d., and the *Art Journal*, monthly, 2s. 6d.)—JUSTICE. (The referee is scarcely likely to publish his award seeing that it is marked "private." We understand he remarked strongly on various defects in the submitted designs.)—R. S. F. (Write to B. T. Batsford, 52, High Holborn, W.C.)—B. and Co. (The general observations in your letter on the fire-proof qualities of concrete have been made long ago by ourselves and by other correspondents. The rest is merely an eulogy of your own system which could only appear as an advertisement.)

Correspondence.

THE BROMPTON ORATORY COMPETITION.

To the Editor of the BUILDING NEWS.

SIR,—A few words by your permission anent the designs for the new church of the Oratory at Brompton. I fail to agree with your critic that they are, taken as a whole, creditable to the Renaissance architects of the day.

Many of the designs have very few, if any, details in common with the Italian Renaissance of the 16th century, the style, I believe, required by the conditions of competition—some even show Romanesque features. The majority seem to me to belong rather to the Classic school of Wren, Inigo Jones, and the 17th century French. Those modelled on the Certosa and the Siennese churches can scarcely be classed as Italian Renaissance. Amongst all this eclecticism one design stands out worthily as a pure Roman church of the best period of Italian art —viz., that bearing the motto "In Gloriam S. Phillipi." The clever arrangement of the chapels, the noble sacristy, correctly arranged with altar, &c., and the grand simplicity and purity of the general design and detail, call forth high commendation. One fails to see why the *réchauffée* of St. Paul's, the Lowther Arcade, and Newgate, could be preferred to this design.

Taking the drawings as a whole they are creditable, but they lack, in almost every case, that delicacy of line and delineation requisite for perfect Classic draughtsmanship. A careful study of "Letarouilly's Rome Moderne" would vastly benefit many of our showy but indistinct draughtsmen.—I am, &c.,

ONE WHO HAS NO INTEREST IN THE
4th July, 1878. COMPETITION.

THE GENERAL CONFERENCE OF ARCHITECTS AND SURVEYORS TO LOCAL AUTHORITIES.

SIR,—Reading your account of this meeting in BUILDING NEWS, June 14th, p. 609, I was surprised Mr. Boult should have expressed himself in his paper in the manner he did as to architects being more capable to act as district surveyors, under a general building Act, than surveyors to local authorities. As regards depositing plans and beguiling surveyors, and as to an architect being appointed for one or more districts (here's the rub), and deceiving men of more intelligence and honourable character, I think Mr. Boult has overshot the bolt. I myself have been a surveyor, and a surveyor of buildings also, in a large city for years, and if Mr. Boult had seen as much of architects and their plans as I have, he would feel ashamed of the profession to which he belongs. He had no reason to think it worth the while of a surveyor to use plans improperly, no more than an architect would do if he was a district surveyor in private practice, as he suggests. A surveyor to a local authority is not allowed private practice generally. Now, which would be most likely to be honourable, does Mr. Boult think? And why should he pry into other architects' plans more than a surveyor to a local authority, or monopolise any districts? I am glad Mr. Ellice Clark was present and spoke out and exposed Mr. Boult's bad reasoning and uncalled-for expressions. It is a well-known fact to building surveyors that not one out of ten architects send better arranged plans than builders and other tradesmen, especially as regards internal or domestic arrangements, and as for the drawings and colourings lads in a school of art are equal to many architects. Perhaps it is felt the profession is overcrowded, and a new market for their services is aimed at—but surely they are not more infallible or proof against temptations than surveyors generally. I am sorry to speak thus, but if any one is capable of carrying out plans deposited, or seeing the material and structural requirements are correct, building surveyors are the men, and now-a-days they are chiefly well educated and respectable, and quite as honourable and able in every respect to be intrusted with such duties as architects, who are found often to be theorists only. There is plenty to be learnt in the profession yet, without thrusting the services of architects into collision with these of practical surveyors. It is to be hoped the Government will not pass an Act to carry out Mr. Boult's ideas at all, and injure another class of good men and the community. I may mention the architect would find it profitable to confer with the housekeeper before he completes his internal arrangements. Here, Mr. Editor, is a new field of employment for architects if they require it. They will find domestic convenience quite as creditable as patched up, elaborately cooked exteriors that have no name or order.—I am, &c.,

June 28th, 1878. AN OLD SURVEYOR.

STONE STAIRCASES AND PROTECTION OF LIFE FROM FIRE.

SIR,—In the paper on "Concrete and Fire-resisting Construction," read by Arthur Cates, Esq., at the General Conference of Architects, reference is made to the "Minera" stone used by J. Whichcord, Esq., in building the patent safe, as "a sandstone promising satisfactory fire-resisting power."

I wish to add, for the benefit of your readers, that "Minera" stone is extensively used with success for the lining of glass furnaces at St. Helen's and elsewhere, and that it cannot be too generally known that many fine-grained homogeneous sandstones produced from quarries in Wales, Yorkshire, Newcastle, and Scotland, are equally suitable for erecting fireproof buildings, and are good in colour and first-class weather stones.

Strong rooms, when lined and ceiled with these stones, are as proof against fire as the glass furnaces referred to. We ought to thank Mr. Jennings for his argument in favour of stone staircases. These, when constructed of fine-grained sandstone, free from laminæ, stand an immense heat, and thus afford (as they ought) a sure mode of egress in case of fire. Unfortunately, most staircases, when constructed of stone, are made of soft limestone, which, in the event of fire, quickly becomes calcined, and needs only water from the fireman's hose to cause it to fall to powder.

Laminated sandstones stand a much greater heat than limestones, but when hot are apt to split upon the hose being turned on them. Not so the homogeneous sandstones above referred to. These will stand the fiercest heat, and even when red-hot will not crumble or fall to pieces under the fireman's hose.

Mr. Jennings is, therefore, quite right when he says: "For the protection of life stone is the best material for staircases."

SAMUEL TRICKETT.

THOUGHTS UPON STRIKES.

SIR,—"Clerk of Works" asks "what relation has bad brickwork, honeycomb walls, &c., to strikes?" This. The men are acting on union system, and will, I believe, rather strike than improve their method. I have found that men prefer dismissal from a job rather than improve in mode. In answer to the second query as to how the subject affects clerks of works, I say this, that if clerks of works had done their duty this atrociously bad style of work complained of never could have become general. I hope architects will see for themselves, and act decisively. There are some good English workmen, no doubt, in the service of old firms of high standing, masters and men holding together; but the striking men are a strikingly bad lot, selfish, greedy, and grudging, whose whole soul is in the base endeavour to get as much as they can in wages and to do as little as they can in work. Systematic idlers, lazy on principle, I hope they see themselves as depicted in the pages of *Fun*. There the "British workman" is done to a nicety.—I am, &c., M.

A CURIOUS LIST OF TENDERS.

SIR,—Having perused the list of tenders published in your valuable journal of June 21 I was (as, doubtless, many others were) struck with the disparity in the builder's estimates for new schools in Oxford-street for the School Board for Plymouth, compared with the architect's estimate of the work.

The highest tender amounted to £7,130, and the lowest to £6,120; there were also eight other tenders, varying from £7,100 to £6,248 16s.; the lowest of all was considered too high, the architect having estimated the work at £3,700.

Now, as a constant reader of your journal, I should be very pleased to see some light thrown on this apparent discrepancy, and in this request I feel I am expressing the wishes of many.—I am, &c., J. S.

June 26th, 1878.

THE LATE CHARLES MATTHEWS.

SIR,—Will you allow me to make one correction with regard to the information which was published last week as to the pupilage of the late C. J. Matthews? He was articled to and served his time with Augustus Pugin the elder, and not with John Pugin, as stated. It may be interesting to add that some plates illustrating St. Paul's Cathedral, signed by C. J. Matthews, were published in Britton and Le Keux's "Churches of London," Vol. I. Charles Matthews was district surveyor for Poplar and Bow for some time.—I am, &c.,

AN OLD TEE SQUARE.

The weathercock on the spire of Holy Trinity Church, Hurstpierpoint, which is 135ft. in height, was repaired on Saturday week by a man named Bishop, who climbed the last 55ft. by clinging to the beading of the spire with hands and toes.

Cardinal Manning has opened at St. Alban's the Church of SS. Alban and Stephen, built from the designs of Mr. Nicholl. The building as opened is the first portion of a scheme, the carrying out of which will involve an outlay of £13,000.

Wellington-square Baptist Chapel, Hastings, was re-opened on Sunday week, after alterations, carried out from the plans of Mr. Elworth, of the same town, at a cost, including re-painting and plastering, of £750.

Intercommunication.

QUESTIONS.

[5428.]—**Granite Setts or Pitchings.**—Can any of your numerous readers say if there is any reliable information to be obtained as to the quantity of granite setts or pitching used in London annually?—GRANITE.

[5429.]—**Lewes—Drawings from Measurement.**—I intend spending a short holiday at Lewes, and should feel obliged for information as to the most suitable buildings in or about that town from which to take measured drawings.—NORTHERN STUDENT.

[5430.]—**Heat Through Walls.**—One side of a new house that I have built joins up to a bakehouse, and although a space of 3in. is left between the new building and where the oven stands in the adjoining property, the heat from the oven comes through very much, and renders the house almost unbearably hot. I shall be glad to know what would be the best course to adopt to remedy the defect.—G. E.

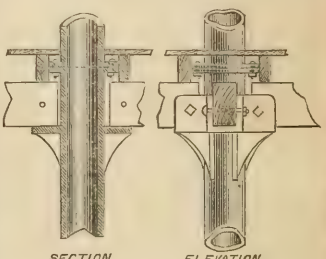
[5431.]—**Keeping Down a Spring of Water.**—A chamber has been built under the ground, in which the water rises to a maximum level of about 4ft. 6in. above the intended floor line. Circumstances render draining undesirable. What kind of floor is absolutely safe to prevent water lifting it? Is there anything better than a bed of clay or concrete and a layer of asphalte? The size of floor is about 12ft. × 9ft.—PERPLEXED.

[5432.]—**Broach Spire.**—Will any of your readers kindly inform me how the term "broach spire" was first originated, and why it was called so?—C. C. S., York.

[5433.]—**Professional Charges.**—On page 690 I notice some very useful information given to "Provincial Architect" respecting "professional charges." Will you kindly supplement and complete the information there given by informing your readers if the 2½ per cent. chargeable for general design and contract drawings includes tracings made for local board; also if the 1½ per cent. for preparing quantities includes supplying same to contractors, or if the sum of ½ per cent. for examining tenders includes supplying contractors with quantities?—C. J. SMITH, Architect.

REPLIES.

[5409.]—**Fixing Columns.**—In answer to "F. J. C.'s" question I send the following sketch. He will see that the heads and feet of columns are not fixed on to girder, but that the girders rest upon



strong brackets cast on to columns. The columns are jointed together between floor and girder, as shown in sketch, thus making one continuous shaft from top to bottom, and each set of brackets receiving the weight of one floor only.—R. J.

[5421.]—**Ventilation.**—An air trunk placed between the timbers, and led into flue, would draw off the vitiated air. For a room of the size mentioned, channels for the admission of fresh air are necessary, and should be made in the floor, with inlets made either in the lower part of walls or along the floor.—G. H. G.

[5422.]—**Pulpit in Exeter Cathedral.**—This pulpit is a memorial one to the martyred Bishop Patteson, who was closely connected with Exeter. The stone of which it is composed is yellow Mansfield. It was designed by the late Sir G. Gilbert Scott, R.A., made by Mr. E. L. Luscombe, and carved by Messrs. Farmer and Brindley. Every one is acquainted with some or other of the many beautiful carvings Sir Gilbert's favourite pupil, Mr. William Brindley, has produced; but of these there are none more successful, perhaps, than are those upon this charming pulpit. Mr. Brindley has risen to his present high position entirely by his own merit. He has overcome the greatest possible difficulties with an energy and perseverance seldom equalled, and rarely excelled, and the merit for this clever work, as well as of much else, is entirely his own.—HARRY HEMS.

[5423.]—**Oak Floors.**—"Provincial" might mix sawdust and hot glue, and brush over the open joints. Of course the sawdust must be very fine.—G.

WATER SUPPLY AND SANITARY MATTERS.

HALIFAX.—A picnic has been held by the Mayor of Halifax and friends, at Widdop reservoir, at the head of the Hebden Valley, to celebrate the completion of the undertaking. The valley is shut in by high hills, and an embankment has been thrown across the lowest part, 270 yards long and 77ft. at its greatest height; it contains 145,000 cubic yards of earthwork, 30,000 of puddle, 3,500 of concrete, 7,100 of stone pitching, and 2,000 of soil. The drainage area thus enclosed is 2,223 acres, with a water area of 92 acres, and a capacity of storage of 654,000 gallons. The conduit bringing the water from Widdop to Castle Carr is partly iron piping (for crossing valleys) and partly by tunnel. The latter works are executed in concrete, and measure 2ft. 9in. by 3ft 6in. The large siphon across the Crimsworth Valley is 913 yards in extent, and the chief tunnel is 2,505 yards long. The main conduit cost £26,602, Wadsworth to Midgley Moors and Shore End Wood and the Castle Carr siphon £1,900, and tunnels at Castle Carr £31,238. The total cost of the Widdop scheme, which has been in course of execution since 1871, has been £118,500. The works were designed by Mr. J. Bateman, C.E., and have been carried out under the superintendence of Mr. J. A. Paskin, C.E., of Halifax.

WALLASEA.—At a special meeting of the Wallasea Local Board, held on the 24th ult., the alleged defects in the sewers, now being constructed in the village, were the subject of animated proceedings. A report by Mr. Edward Pritchard, C.E., was read, in which the works were stated to be inadequate for the purpose, and not in accordance with the plans and specifications of the surveyor (Mr. James T. Lea). Had the works been carried out as originally designed they would have been sufficient, but the concrete foundations in faulty ground, and the construction of manholes, had been omitted, and in consequence of the treacherous nature of the quicksand, the former omission might become a danger to the roads and buildings which might be undermined. A letter was read from Mr. Lea, stating that the alterations were made in the interests of economy, but it having been stated that the alterations would cost £10,000, a resolution was passed expressing the "opinion that the course taken by the surveyor in ordering verbally deviations and omissions from the works as specified, without asking the consent of this committee, calls for most severe censure," and recording extreme dissatisfaction with the manner in which the work has been superintended by the surveyor. It was also decided that the works be taken out of his hands, and that Mr. Pritchard be requested to complete the examination and to superintend the completion of the works, as nearly as possible in accordance with the plans and specifications approved by the local authority and by the Local Government Board.

The directors of the London and North Western Railway Company have accepted the tender of Messrs. Baker and Firbank, of Dewsbury, for widening that portion of the Liverpool and Manchester line between Barton Moss and Cross-lane stations, a length of about 5½ miles.

The Ilkeston Local Board recently received no fewer than 140 tenders for the supply of materials or labour for the proposed new auxiliary waterworks. These were referred to Mr. Fearn, C.E., of Chesterfield, their engineer, and, in accordance with his advice, tenders have been accepted in most of the sections. The works are to be commenced forthwith, and will be completed, it is expected, at the close of the year.

STATUES, MEMORIALS, &c.

LEEDS.—The Hook memorial at the Leeds parish church was unveiled on Saturday. The memorial consists of a recumbent figure in white marble, representing the Dean in his ecclesiastical vestments, and has been executed by Mr. W. Day Keyworth, jun., sculptor, of Buckingham Palace-road, London. The figure rests upon a Gothic alabaster tomb, which has been executed by Mr. Anthony Welsh, Woodhouse-lane, Leeds, from drawings furnished by the late Sir Gilbert Scott shortly before his own death. The total cost of the memorial is nearly £1,000.

STAINED GLASS.

WIRKSWORTH CHURCH.—Two windows have been placed in the Gell Chapel as memorials to some members of the Gell family. The east window contains the subject of the "Resurrection," and the "Agony in the Garden" as a base. The north window, "The Raising of Jairus' daughter," and "Setting a little child in the midst by the Lord, teaching a lesson of humility." They were executed by Camm Bros., 41, Frederick-street, Birmingham.

The new Wesleyan Church at Alexandria, N.B., was opened on Sunday last. Accommodation is provided for 230, and the entire structure will cost about £1,350. It was erected from designs, and under the superintendence, of Mr. Malcolm Stark, jun., architect, Glasgow.

The following grants, in aid of church restoration, were voted at the Ely Diocesan Conference last week:—Walsham-le-Willows, Waterbeach, Tharning, and Houghton Regis, each £50; Wicken, Snailwell, Soham, and Swaffham (Cams.), each £30; Felsham and Wattisfield, £25 each; Ely, St. Mary, Hopton, Horseheath, and Landbeach, £20 each; and Shudy Camps, £15. For a new church at Guyhirn, near Wisbech, £25; enlargement of St. Barnabas, Cambridge, £100; and mission chapel, St. Paul, Bedford, £20 were voted; and grants were also made towards vicarage houses at Luton, St. Matthew, and Upwood-cum-Raveley Magna, and rectory at Coates. A resolution was passed declaring it advisable that a diocesan architect be appointed.

It is proposed to make some alterations to the parish church of Llanfairisgar, near Carnarvon. They will be carried out from the designs of Messrs. Pugin, Ashlin, and Pugin, of Westminster.

A new cloister has just been commenced at St. Benedict's Monastery, Fort Augustus, N.B. The style is thirteenth century. Messrs. Pugin, Ashlin, and Pugin, of Westminster, are the architects.

A new Wesleyan chapel has been opened at Wroughton, Wilts. The style is Gothic, and the building, which is of red brick, with bands of white and black bricks and Bath stone dressings, will seat 240 persons. The architect is Mr. Orlando Baker, of New Swindon, and the builder Mr. Geo. Wiltshire, of the same place; the cost is £700.

The new winter gardens and pavilion at Blackpool, Lancashire, which have been erected at an expense of £100,000, are to be opened by the Lord Mayor and Sheriffs of London on Thursday next, the 11th inst.

The Felstead and Rayne School Board have adopted plans prepared by Mr. Charles Pertwee, of Chelmsford, for a school to be erected near the Watch-house, Felstead, and another near the Rayne railway station; and these having been approved by the Education Department, tenders are wanted at once.

Our Office Table.

THE following are the awards in the Architectural Department of University College, London:—Prof. T. Hayter Lewis, F.R.I.B.A.—Fine Art, Senior Class: Donaldson Silver Medal, F. D. Topham, of London. Certificates, 2. E. R. Hewitt, of London; 3. A. G. Morton, of London.—Junior Class: Prize, R. E. Smith, of Forest-hill.—Construction, Senior Class: Prize, F. D. Topham, of London. Certificate, 2. R. H. Willis, of London.—Junior Class: Prize, W. W. K. Clarke, of London. Certificates, 2. W. Grellier, of London; 3. A. G. Morton, of London; 4. A. J. Gale, of London; 5. J. D. Butler, of London.

MR. H. FAIJA, whose paper on "Portland Cement" we published three years since, has established a Portland cement testing room and laboratory at 4, Great Queen-street, Westminster. He has made arrangements which will enable him to carry out, in an efficient and thoroughly reliable manner, all such tests as are usually required by engineers and architects, and also to make such analysis of raw materials as are often necessary for manufacturing purposes. All tests and analyses are carried out under his personal supervision, and with each test or analysis Mr. Faija gives a guarantee that the results arrived at are in every respect the true ones. Each test, except when especially required otherwise, will consist of tests for weight, fineness, tensile strength, expansion, and contraction. The fee for such a test is two guineas, and other tests and analysis will be carried out at a proportionate rate.

MR. ARTHUR WALLIS COLLING, the clerk of the works at the New Law Courts, under Mr. G. E. Street, R.A., died on the 24th of June last, after a short illness, in the 61st year of his age, having held the office for eight years and a half. Mr. A. W. Colling, who was the brother of Mr. James K. Colling, commenced his career many years ago as a clerk of works for several buildings under the late Sir G. Gilbert Scott, when that gentleman was in partnership with Mr. Moffatt. He afterwards was for several years in the employ of Messrs. Peto and Betts, and carried out for them, having the sole management, very extensive building works on the Great Eastern Railway, as well as, subsequently, others of a similar character on the loop-line through Lincolnshire of the Great Northern Railway. Having left their service at the termination of these works, he became engaged under the late Mr. William Burn, the architect, and remained in his service until that gentleman died. Among many other works which he superintended while under Mr. Burn, were some very important alterations and additions to Holkham Hall, for the Earl of Leicester, and the erection of Montagu House, Whitehall, for the Duke of Buccleuch. At the termination of this large and somewhat difficult work, he passed into the service of Mr. Street, who en-

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N.B.—DIAGRAMS AND PROSPECTUSES ON APPLICATION.

gaged him as his principal clerk of the works for the New Law Courts, where, had he lived, he doubtless would have remained until their completion.

A THREE-STORIED house is reported to have fallen at Baltimore, burying eight men, killing the master bricklayer, and injuring all the others. The cause in this case is not far to seek. It appears, from our American contemporary, the house was exposed on one side, and that a 4½in. party wall was built the whole height. This wall was not stayed by any means, we are informed, and the bare weight of the floor and roof, which latter was being put on, caused the accident. We only point to the case to show what foolhardiness there exists in large building communities. The American Institute of Architects have been trying hard to pass building enactments, but have been defeated by the opposition of builders, and we are informed it is not uncommon to build walls of 3 or 4 stories in this reckless manner. In Indiana, too, a wood and iron bridge of a new pattern has fallen, built about nine years ago.

CHIPS.

On Saturday the grounds of the Potternewton Recreation Club, which are situated in Reginald-terrace, Chapeltown-road, Leeds, were formally opened. They comprise a tennis and croquet lawn, bowling green, archery ground, and playground for children, in addition to promenades and shrubberies. It is intended to erect a club, and the plans of Mr Charles Fowler, architect, have been accepted. This building will comprise a reading-room, smoke-room, billiard-room, ladies'-room, and assembly-room, &c. The cost of both ground and club will probably reach between £5,000 and £6,000. The club will be built in the Swiss style.

The foundation stone of the new church of St. Philip, Rifle Butts-row, Mill-road, Cambridge, was laid on Thursday, the 27th ult. The church is to be built of wood, brick, and stone, with plain tiles, and will be fitted with open benches. The dimensions are 50ft. by 10ft. in width, and 20ft. to roof top apex. In front will be a porch. Mr. Pate, of Cambridge, is the builder.

Foundation stones have been laid of a Welsh Congregational chapel at Llandiloes. The contract has been taken at £1,550, and the chapel will be Grecian in style, and will seat 455 persons.

The Trinity Board have decided to build the new Eddystone Lighthouse not under contract. The estimate of the board's engineer was £90,000. There were three tenders, that of Mr. Pethick, of Plymouth, the lowest, being £105,000.

We might have stated last week, in our description of Stonyhurst College, that all the flat roof is covered with asphalte from the Pyrimont deposit, now called, as in 1838, Claridge's, for the better securing the use of such particular asphalte. The word "Seyssel" is now occasionally given to any make of bituminous mastic. The roof referred to contains close upon 50,000ft. superficial.

Schemes for drainage and water supply of Polruan, Cornwall, are in course of preparation by Mr. E. Appleton, of Torquay, from whose designs waterworks have just been completed at West Looe.

West Hackney Church is about to be renovated and decorated in accordance with the plans of Mr. Bodley.

The departure from Warwickshire of Mr. J. Tom Burgess, F S A., who has been for thirteen years the editor of the *Leamington Spa Courier*, to take up a similar position on *Berrow's Worcester Journal*, was marked, on the 24th ult., by the presentation, on behalf of the leading clergy and gentry, as well as of those known in the antiquarian, archæological, and literary world, as a token of remembrance and respect, of a purse containing £150, and a handsome gold watch and chain. In the evening the literary staff of the *Leamington Courier* and a few friends entertained Mr. Burgess at a farewell dinner. In the course of the proceedings, Mr. Barter White, who had been associated with Mr. Burgess for the past twelve years, presented him with an illuminated address and a valuable pocket aneroid barometer. Mr. Burgess was also presented with a silver-gilt inkstand, and some valuable books and drawings.

The re-opening of the nave of the parish church of Havant took place on Tuesday week. The nave was originally built in 1831, and its restoration has been a part of an almost entire reconstruction of the fine building, at a total cost of £1,500, under the superintendence of Mr. Abley, the agent of the contractors, Messrs. Hale and Son, builders, of Salisbury.

Friday next is fixed for the reopening of the chancel of Ashbourne Church, Derbyshire. It is now two years since the work of restoration commenced. The work has been carried out by Mr. Collins, of Tewkesbury, under the direction of the late Sir G. Gilbert Scott, R.A.

A new club has been erected at North Shields by Mr. Robert Bolton, jun., from designs by Mr. Henry Miller, architect. The building is of brick, with bay windows and dressings of stone. The cost, including the land, is about £3,500.

The Cotswold Field Club visited the Forest of Dean on the 25th ult., when they inspected the church of St. Briavels, an edifice restored in 1830, but still containing Norman piers and arcade on south side and some Early English work, and the ruins of St. Briavelese Castle, among them noting the numerous portcullises and the rudely sculptured and very early chimney-piece.

The foundation stones of a new Baptist chapel were laid in Octavius-street, Douglas-street, Deptford, on Tuesday week. The chapel will be of red and white brick, with Bath stone dressings, and will seat, with gallery on three sides, about 500 persons. Mr. C. J. Porter, of New Cross-road, is the architect, and Mr. J. Morter, of Stratford, Essex, the builder. The contract price for erection is £2,605.

The judges in Queen's Bench regard the question whether the Rev. F. G. Lee, D D., the vicar, is the owner of the church of All Saints, Lambeth, and therefore liable for the repairs recently executed to the tower and spire, as too doubtful to be decided in connection with the rule *nisi* that had been obtained by the Metropolitan Board of Works.

The East Cowes Local Board of Health resolved last week to adopt plans and a scheme for draining and sewering the new district known as the Park Estate, prepared by Mr. G. Wheeler, and estimated to cost £4,700 in execution. Application has been made to the Local Government Board for a loan of £5,000 to carry out the work.

The School Board for Newport, Mon., on Friday last, again considered the plans sent in competition for new schools, and decided to adopt the amended ones by Mr. Fawckner.

The guardians of the City of London have accepted a tender for £6,109 for building porter's lodge, &c., at Homerton workhouse; the estimated cost was £5,500.

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Trade News.

WAGES MOVEMENT.

GLASGOW.—The Glasgow glaziers came out on strike on Saturday against the proposed reduction of their wages from 7½d. to 7d. per hour.

RUNCORN.—On May 1st the joiners of Runcorn struck work for an advance of wages from 33s. 6d. to 36s. per week, and 53½ instead of 55½ hours per week. A general meeting of the men was held last week, and they decided to go in on the old terms, so that the strike has now terminated.

RHOS SLATE QUARRIES.—Mr. Parry, arbitrator in the strike at the Rhos Slate Quarries, which has continued for five weeks, has decided adversely to the men, who have accepted the decision.

WHITLAND ABBEY GREEN SLATES.
These SLATES are of a grey-green tint, are stout, and made in all sizes. A large stock available for immediate delivery. For further particulars (with a list of important buildings covered) apply to the MANAGER, Clynderwen, R.S.O., Carmarthenshire.—[ADVT.]

Holloway's Ointment is not only fitted for healing sores, wounds and relieving external ailments, but rubbed up in the abdomen it acts as a derivative, and thus displays the utmost salutary influence over stomachic disorders, derangements of the liver, irregularity of the bowels, and other intestine inconveniences which mar man's comfort.

TENDERS.

BARNET.—For alterations and additions to house and stables and a gardener's cottage at Barnet, Herts, for F. A. Bevan, Esq. Mr. John Usher, architect, Bedford:

Foster, S.	£5,700
Twelvetrees, E.	5,660
Ashby and Horner	5,452
Edy, T.	5,306
Wood, F. and F. J. (accepted)	5,287

BIDWAS.—For the erection of schools at Bidwas for the Governors of Aldworth Charity. Mr. J. J. Evans, of Treorky, architect:—

Jenkins, J. T., of Treforest (accepted)	£1,930

BLACKBURN.—For the erection of additional municipal offices in the market-place for the Blackburn Town Council:—

Whittaker, Jas. (accepted)	£5,896

[21 tenders were sent in.]

BISHOPSGATE.—For the pulling down and rebuilding of No. 33, Norton Folgate, Bishopsgate, E., for Wm. Barker, Esq. Mr. J. H. Rowley, architect, No. 13, Walbrook, E.C.; quantities supplied by Mr. Wm. Allport:—

Downes	£1,683
Bellam and Co.	1,628
Scrivener and Co.	1,596
Garrard	1,583
Boyce	1,539
Johnston	1,470
Smith and Son	1,464
Wagner	1,396
Johnson	1,373
Marr (accepted)	1,256

CAMBERWELL, S.E.—For brick and pipe sewers to be laid in Melbourne-grove, for the Vestry of Camberwell:—

Denyer, D. (accepted)	£725

CAMBERWELL, S.E.—For brick and pipe sewers in College-road, for the Camberwell Vestry:—

Pearson, Mrs. Caroline (accepted)	£187

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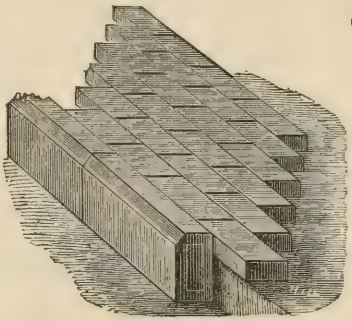

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THE BUILDING NEWS.

LONDON, FRIDAY, JULY 12, 1878.

COMPETITION, COST, AND STYLE.

COMPETITION estimates are a source of constant perplexity both to the public and to architects; and the profession have almost a proverbial reputation for exceeding their estimates. Recently two competitions of importance reviewed in our pages have given rise to some remarks upon this point. In one case—that of the church for the Oratory at Brompton—the instructions issued to architects left them perfectly free as regards cost, with the result that the design selected has been chosen from among the most costly, and that some of the competitors are dissatisfied with the decision. In the second instance—that of the Town Hall for Great Yarmouth—the stipulation as to cost is to be strictly adhered to—at least, if we are to give credit to the expressed intentions of the Town Council. Now, there is either fairness or unfairness in either of these conditions. If the cost is to be disregarded, the competitors should certainly have been informed of the intention before the preparation of their designs; for to ignore the element of cost altogether is obviously to place many upon an unequal footing. It seems time that some rule were agreed upon to make so fundamental a condition compulsory, or to abandon the restriction as to cost altogether. The present lax mode of conducting competitions, and the constant trouble and dissatisfaction they give rise to, spring mainly from ignoring this crucial test of the value of a design. It may be argued that competitors themselves are so careless in making competition estimates that little reliance can be placed upon them, and that the only means of judging of the cost of a design is by comparing it with those of other authors. This is very true; but architects have been taught to disregard correct estimates by the very unsatisfactory decisions generally made. They have come to estimate their chances solely by architectural display, by favouritism—which they know will always have the greatest weight by division of votes—or by the other loose modes of decision committees and individuals invariably adopt. It is not surprising, therefore, to find this careless disregard for estimates growing; but the most unfortunate circumstance about it is that the system holds out a premium to the unscrupulous, and operates to the disadvantage of those who have conscientiously kept the question of cost in view, while the employers, on the other hand, find out when too late that they have committed themselves to a design that will cost more than their funds permit.

There may be something to urge against the cost condition. It may be thought to mislead the public on the one hand, or to fetter the architect on the other; but how, we ask, can any competition be fair that does not stipulate cost as one of the plainly-recognised tests of merit? In the Brompton Oratory competition several creditable productions have been eclipsed and set aside by the greater pretensions of others; and the same will happen if the Corporation of Great Yarmouth do not carefully keep in view the limit they have set out with. It is very true that an architect's estimate occasionally misleads; but the framers of competitions have the matter in their own hands, if they cared to exercise due caution. A simple clause to the effect that the cost shall not exceed a certain sum, or a certain percentage of it, is not a guarantee, unless the committee appoint a surveyor to estimate the quantities of the several designs. Our experience of competitions has shown the unreliability of placing much confidence in cubed estimates—the only process usually adopted by competitors—as the design is almost invariably made and finished before the cubical measurement is thought of, and with what consequence we need hardly say: the cubing is made to fit the design—not the design the cost. The elasticity of competition cubing is amazing. The competitor may relieve his conscience by omitting his roof or basement, his tower, &c., from the measurements, or, if the cubic contents are fairly worked out, the difference can almost as easily be adjusted by estimating at 2d. or 3d. per foot less. When we find members of the profession coolly informing their employers that they have estimated their building at 6d. or 6½d. per foot, we may well smile at the very facile and compliant figures of competing architects. As this method of estimating, however, is not likely to be abandoned by competitors, we may suggest a mode of dealing with it that would obviate the inconveniences and anomalies we have referred to. Let every architect be required to give the area or cubic capacity of his design in a scheduled form, instead of the cost merely. By this means every design could be relatively estimated by the surveyor or referee. If a blunder in stating the capacity occurred, it should be held to be an infringement of the terms of competition. In the Yarmouth competition an area of 14,000 square feet was given as the site. Few of the competitors have kept their buildings much within this area. But, taking it as a basis, the committee may approximately estimate the contents of the various designs by simply comparing their third dimension—the height—when they must inevitably reject more than one very lofty elevation as excessive in cost. Although a second floor in this instance was required for the hall-keeper's residence, kitchen, and offices, the accommodation has been most successfully met in many designs by keeping the main building down to two principal stories or orders, and obtaining the third story by dormers over some portion of the official departments. By this plan the height of the building, and consequently its cost, is reduced. Calculating 14,000 square feet as the area, and taking a fair height—say, 55 or 60 feet—we obtain a cubical measurement that, if worked out at 10d. per foot, which we consider the very lowest figure possible for buildings of this class, will rather exceed the proposed outlay than fall within it. Our examination of the designs clearly shows that many of them could not be carried out for this sum—for some of them, indeed, 14d. per foot would not be too high an estimate. What we contend for here is that some criterion or basis should be made a *sine qua non*, and we believe that it would serve all the purposes of justice if the cubic contents of each building, estimated upon certain principles, were to be given with each design, so that the committee or their professional adviser could attach a fair and workable price to the design submitted. A florid Gothic or palatial Italian design, we know pretty well, costs at least from 25 to 30 per cent. more than one in a simply-treated or Vernacular style, in which effect is obtained by the grouping of the parts, by the decorative use of brick, and by visible roofs; but every practical architect, if he knows his cubing is correct, can attach a fair price to any design. So far, then, there is no real need for a committee to be misled by false or spurious estimates. We may just add that we have little faith in guaranteed estimates. There may be some protection if a respectable builder guarantees to execute a design for a certain sum; but there are hundreds of loopholes by which he can escape from carrying out his pledge, and our experience of guaranteed estimates is simply this—that they are altogether fallacious. We have never yet heard of one instance where the guarantor secured the performance of a contract.

Coming to the second objection—that this condition fetters inventive design and the art-skill of the architect—we may say the notion is preposterous. When an architect knows he cannot go beyond a certain amount he generally uses more thought and contrivance in his plans: he tries to economise every bit of space, to reduce the length of his corridors, and, in short, to condense his scheme to the utmost. We have never known an instance where this process has not resulted in decided gain architecturally. It is the unrestricted use of space, money, and ornament that has been the curse of modern architecture. Architects, under this *régime*, have little to think about but to "design;" they contrive loosely; their compositions lack the method and economy of well-thought-out problems; and we find all sorts of extravagant ideas perpetrated, not only upon people, but in bricks and mortar. The best designs have been those in which the economy has been exercised from the first, in the initial plan, instead of in cutting and shaving down an extravagant design afterwards, with the effect of robbing it of all solidity of feature, and reducing its architectural adornment to skin deep proportions. We have no faith in this last kind of economy either in art or in industry.

Related to this question is the other one of style. As long as the public and architects look for style in building we are bound to acknowledge it as a potent element in competition. Unfortunately its extravagant pretensions in some hands have an overpowering influence, and here, again, we find the value of restricting the display of mere ornamentation by some regard to cost. In both the Brompton and the Great Yarmouth competitions the Renaissance has been the ascendant style. This is a result we were among the first to prophesy. If, however, the Renaissance is to supplant Gothic, and to obtain public recognition, we plainly see that its claims must be largely supported by economy. In these two competitions the style will be put upon its trial, and we hope that its second revival amongst us will not be jeopardised by the more ardent and immoderate ideas of its disciples and converts.

THE EXHIBITION OF FANS AT DRAPERS' HALL.

IT is something that any of the City Companies should not be ashamed of the trade to which they owe their existence The Fanmakers' Company are doing well in their attempt to revive the interest in their special craft. Fans have been in use, doubtless, as long as any article of comfort or luxury, and very beautiful have many examples been. In England, where our weather is usually cold or temperate, we do not actually need them, except after violent exercise; and, so fashionable as they were till towards the end of last century, the art of fan-making bade fair to die out. "How completely," says Mr. G. A. Sala in his clever preface to the catalogue, "fan-making, as a branch of British manufacturing industry, had declined among us at so recent a period as the fourteenth year of the reign of Her Majesty Queen Victoria, will be shown by referring to the official description and illustrated catalogue of the exhibition of the works of industry of all nations in 1851. From Spain Señores Don Antonio Pascal-y-Ahad, of Valencia, and Don Rafael Mitzana, of Malaga, sent a series of fans, and paintings for fans. Exhibits of a like kind were displayed by Holmes, of British Guiana, Henderson and

Rocheleau, of Canada; Doucert and Petit, Felia and Davelleroy, of Paris. Fans, either dainty or quaint, or quaintly savage in design, were sent from Ceylon, from China, from Egypt, from Trinidad, in the West Indies, and from the West Coast of Africa. From Great Britain, in the way of production, came nothing whatever." In this art, as in many others requiring taste, it was taken for granted that the French alone were capable of excelling. How foolish the idea was has been proved in many ways—very remarkably by the great revival in the trade of which the present is the outcome, and it is to be desired that the spirited action of the Fan-makers' Company will still more stimulate the production of this useful, and often very beautiful, article of luxury. The Company invited competition in every description of fans—ancient and modern, cheap and costly, simple and elaborate, proposing prizes under certain conditions for all sorts. For the purpose of discriminating they divided the collection into four classes, with certain sectional classifications in particular cases. To show how extensive is the range of the competition, we have only to mention that one fan is valued at £400—one, also a present, being probably worth twice that sum, while there are others as low as 2d., or even 1d. a-piece; and this is as it should be. The industry can never flourish on the manufacture of the costliest kind of fans. First of all, we want such as will be practically useful for the purpose for which they are made. If merely ornamental, they are only a useless extravagance, and will only be bought in obedience to a wasteful fashion. If thoroughly answering the purpose for which they are wanted, then they cannot be too highly ornamented—and it is astonishing how very beautiful many examples are. Nor is it quite necessary that, because beautiful, a fan need be very costly? To produce such as were made in the most extravagant times of the French Monarchy, no doubt much time, talent, and money were required. As the French spent fortunes upon their furniture, china, bronzes, and other articles of luxury, so no pains were spared in their fan-making, as may be seen in many splendid examples in the present exhibition; but we know many processes which were unknown to them, and we have also materials of which they knew nothing, and so should be able to greatly reduce the price without detracting from the effectiveness. Hence copying of old patterns and designs, at however great a cost of skill and time it is performed, will never be wholly satisfactory, or, in fact, at all worth the time and skill bestowed. This is clear from several examples in the present exhibition. No. 342, exhibited by Messrs. Triepus and Ettlingess, is said to have taken 6 months to make, and the value is set down at £125. Another, with sticks of a somewhat similar kind, elaborately carved in mother-of-pearl, 623, shown by the Crown Perfumery Company, is priced at £157 10s.; but though each is admirably carved and fairly designed, there is lacking that freshness and feeling of original work that no amount of pains can supply. There is evidence throughout the exhibition of new life in many directions, and that is what we want. Some good effects are produced in an easier manner than used to be possible — though, of course, handiwork will always be more valuable and satisfactory than mechanical skill, as all cannot afford to have it. A company like the Fan-makers, having the life of its craft at heart, should welcome any process or material that would conduce to the production of a useful and a peculiar article that could be sold at a reasonable price. Tortoise-shell, enriched with piqué ornaments, as may be seen in some rarely choice examples in the collections of Mr. E. Joseph and Lady Musgrave, is quite charming, but very expensive. Almost as good an effect is shown in many modern mounts where the surface is etched or even stamped, and filled in with thick gold leaf. The present shape of fans appears to be sensible, and likely to endure, but we doubt if it is altogether wise to be so wedded to the seventeenth and eighteenth century style of figure or flower decoration, painted on skin or other material. Some of the Chinese ivory lace-work fans, in which each stick is ornamented separately, though, of course, with a relation to its neighbour, are, on the whole, so good in design as well as faultless in execution, that many good hints might be taken by real artists. At any rate, a stereotyped form of fan and mount will be sure, in time, to injure the craft and prevent the progress, which cannot be maintained without novelty.

The exhibition may be pronounced to be a decided success. The hall, however, in which it is held, though splendidly fitted for the grand entertainments which take place there, is scarcely suitable for an art exhibition; consequently, a large proportion of the old work is scarcely to be seen at all. Those who had to classify the ancient portion wanted more room and much more light, and so seem pretty nearly to have abandoned the matter in despair. The catalogue is very imperfect, and carelessly got up.

Naturally suffering from the great disadvantage of want of light, the committee first had to pay attention to the display of the modern work, and in this they have been fairly successful. The greater part of the most interesting and important examples can be well seen. There is a prodigous number of unmounted fans, and designs of very various merit. The production of them being so pleasant and interesting, and not having the drawbacks attaching to other decorative pursuits, makes it particularly suitable for ladies; and so, as a matter of fact, we have many painted, and well painted, by them. A. Danos, of Paris, an amateur, sends (142) a very effective painting in water-colour on black silk, representing "The Spanish Wedding." Another, a moonlight love scene, without a number, but by G. Rey, is particularly pleasing. 225, by Miss Marie O'Keonan, is good, and so are several exhibited by W. B. Henley. Throughout this section there is much good, some admirable work.

The Crown Perfumery Company has an interesting case containing articles explanatory of the manufacture. Their collection, generally, is full of interest, among the best of them many fine fans may be mentioned—Nos. 623-634, Chantilly lace mounted on black, pearl carved and inlaid, and 656 in the Renaissance style, the subject being "A Marriage of Nobles" painted on skin. Count Wils, of Paris, who is a good artist, is in the habit of painting views and giving them as kindly reminiscences of his visits to his friends. 341A, belonging to the Princess of Wales, and 691, to Countess Somers, are especially good. The most costly presentation fan in the whole collection is that which Dhuleep Singh gave to Princess Alice; the outside sticks and tassels are covered with fine Oriental pearls, emeralds, and rubies. The fan itself is hardly equal to its cover. Messrs. Triefus and Ettlingess' extensive and very varied collection has attracted many English buyers. The prices vary from £125 to £1 10s. Many are to be commended for their strength and lightness, as well as for artistic qualities. H. F. Daltray and Co. exhibit many good specimens, but no prices or descriptions are given. One of the best fans in the ancient style is No. 469, the mount of mother-of-pearl being brightened in varnished colours. W. B. Henley's beautiful series competes favourably with most of the others in quality, and especially in price. No. 571 strikes us as particularly good and reasonable. Austria sends many useful and pretty fans, mostly made partly of feathers. Much originality and variety is to be observed in the cases of V. Marcot; 728, 735, and 738 are good specimens of various prices. J. Duvelleroy does not fall short of his great reputation. His collection embraces fans of the most costly description — unmounted fans on skin, valued at from £130 to £25 each, some beautiful lace, Brussels and Chantilly, and fine fan mounts. The carving and general harmony of colour and design shown in the best of these fans leaves little to be desired.

To describe the really magnificent collection of ancient fans, as at present exhibited, would be impossible. There are superb examples of almost all styles of the latter part of the 17th and of the 18th centuries. Such dates as that given to No. 792 (A.D. 1500) and a few others are quite out of the question. The paintings ascribed to Boucher and Watteau were—in all the examples we could identify with the published numbers—decidedly not the work of either of those artists. It would be very interesting to know whether the fans said to belong to Queens Anne and Charlotte were ever really theirs. The latter seems scarcely such as even a really homely queen would have used. Though practically without arrangement, and, for the most part, only partly visible, there can be no doubt that a far finer collection has been brought together in Drapers' Hall than we have had the chance of seeing before. For this reason it is very vexatious that a more fitting place of exhibition was not available in the City, and that more time and knowledge of the subject, sufficient properly to describe, classify, and exhibit these really beautiful works of art, was not to be had.

COMPETITIONS.

CROYDON.—A limited competition has just been held at Croydon, at the invitation of the School Board of the town, for new schools to be erected in the Mitcham-road, Croydon. The award was arrived at last week. Five architects sent in plans: of these two were selected for final award—viz., those by Messrs. Rutley and Blackwell, architects, of Dowgate-hill, E.C., and by Mr. S. Brooks, of Croydon. The design of the former firm has been determined upon, and the work will proceed forthwith.

NOTTINGHAM.—A new school is to be erected at Nottingham by the School Board who have received no less than 22 or 23 sets of designs, although the competition was not advertised in the London papers, having more a local than open character. The plans were received during the latter part of last week.

SOUTHPORT.—We published Mr. Waterhouse's report as professional referee in this competition (see BUILDING NEWS, Dec. 14th, 1877), which was adopted by the town council who, in accordance with the terms of the competition, paid the premium. The first was taken by Messrs. Coe and Robinson, architects, of Furnival's-inn, E.C., the second by Messrs. Bell and Roper, architects, London, and Manchester, and the third by a local firm of architects, Messrs. Mellor and Sutton, with Mr. John Dence. It has now been determined, we are informed by a correspondent who refers to the matter as "one of the most glaring pieces of injustice he has known"—that neither the first nor second design is to be executed, but that the works are to be proceeded with from the design and under the superintendence of the last-named architects, Messrs. Meller and Sutton, of Southport. Mr. Alderman Sutton, chairman of the markets committee, is brother to the architect engaged, we hear. Ashamed apparently of the manner in which they have acted, it seems the committee will not allow the publication of the premiated designs.

New Church of England schools are about to be erected in Church-street, Gainsborough, from the designs of Mr. E. Wright, of that town.

John Giles & Gough. Architects.

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+ Cavendish College + Cambridge +

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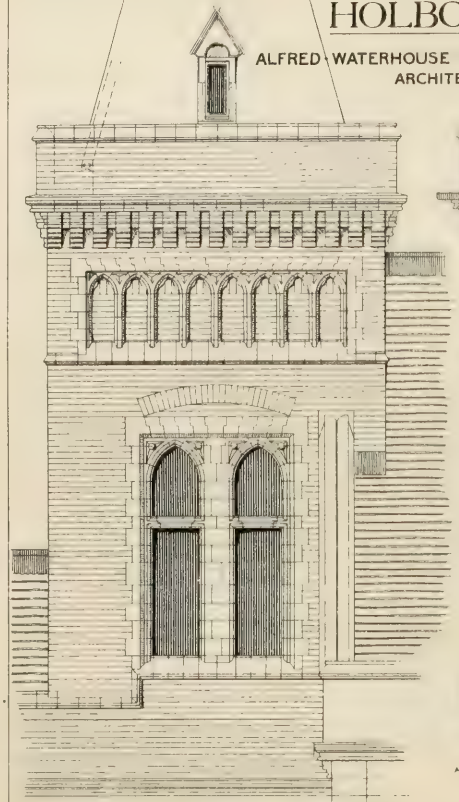
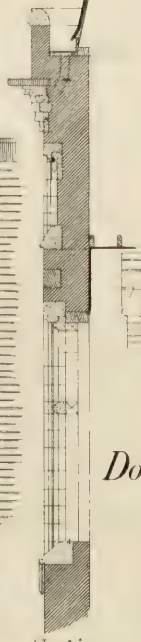
ARCHITECT



Elevation of Tower in Brooke St



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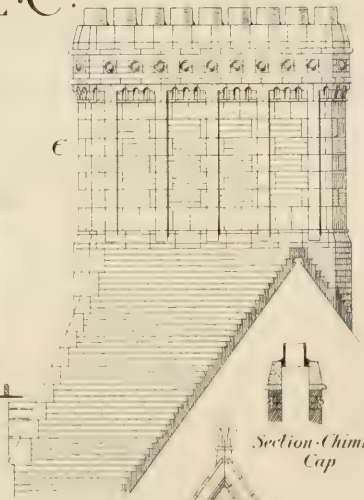
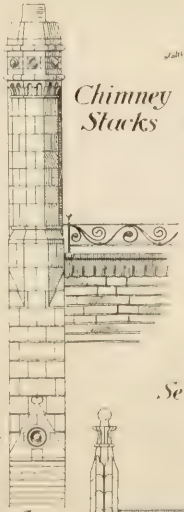
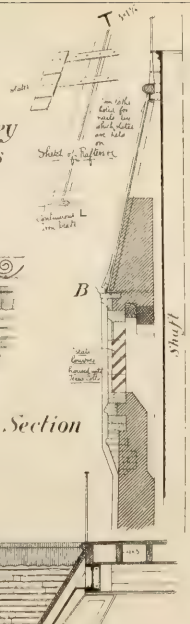


Side



Chimney Stacks

Front



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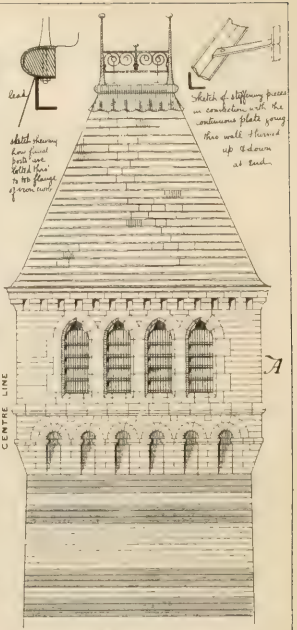
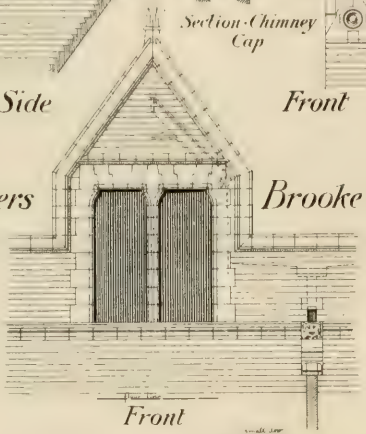


Ventilating Shaft · Brooke St

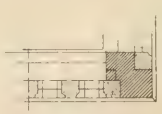


Dormers

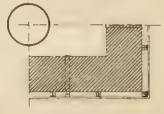
Brooke St

Front

Section



1/4 Plan at A

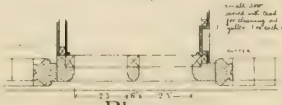


1/4 Plan at B

Scale of Feet

Alternate courses

Plan of Chimney Stack at C



Plan

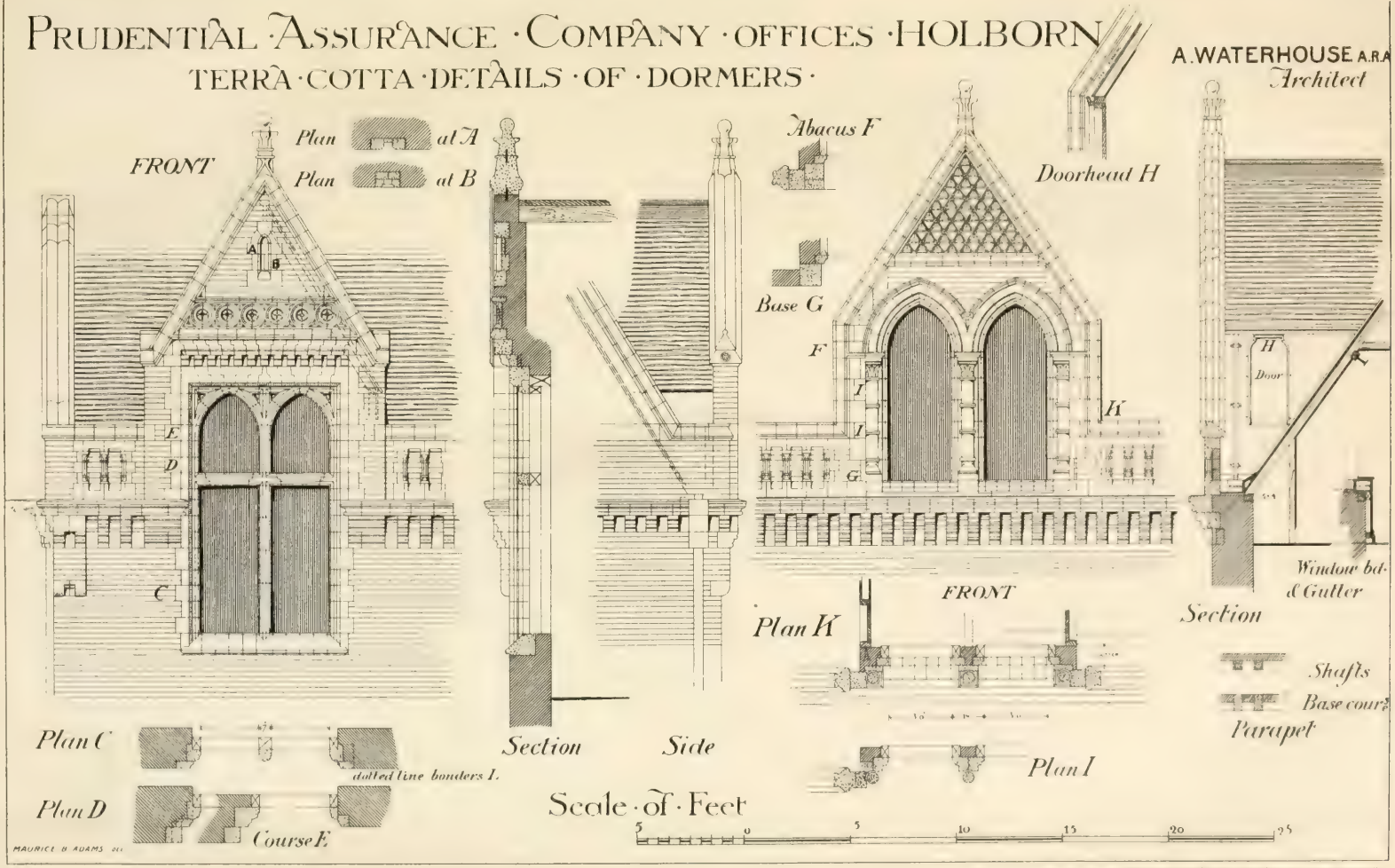
DETAILS OF TERRA COTTA

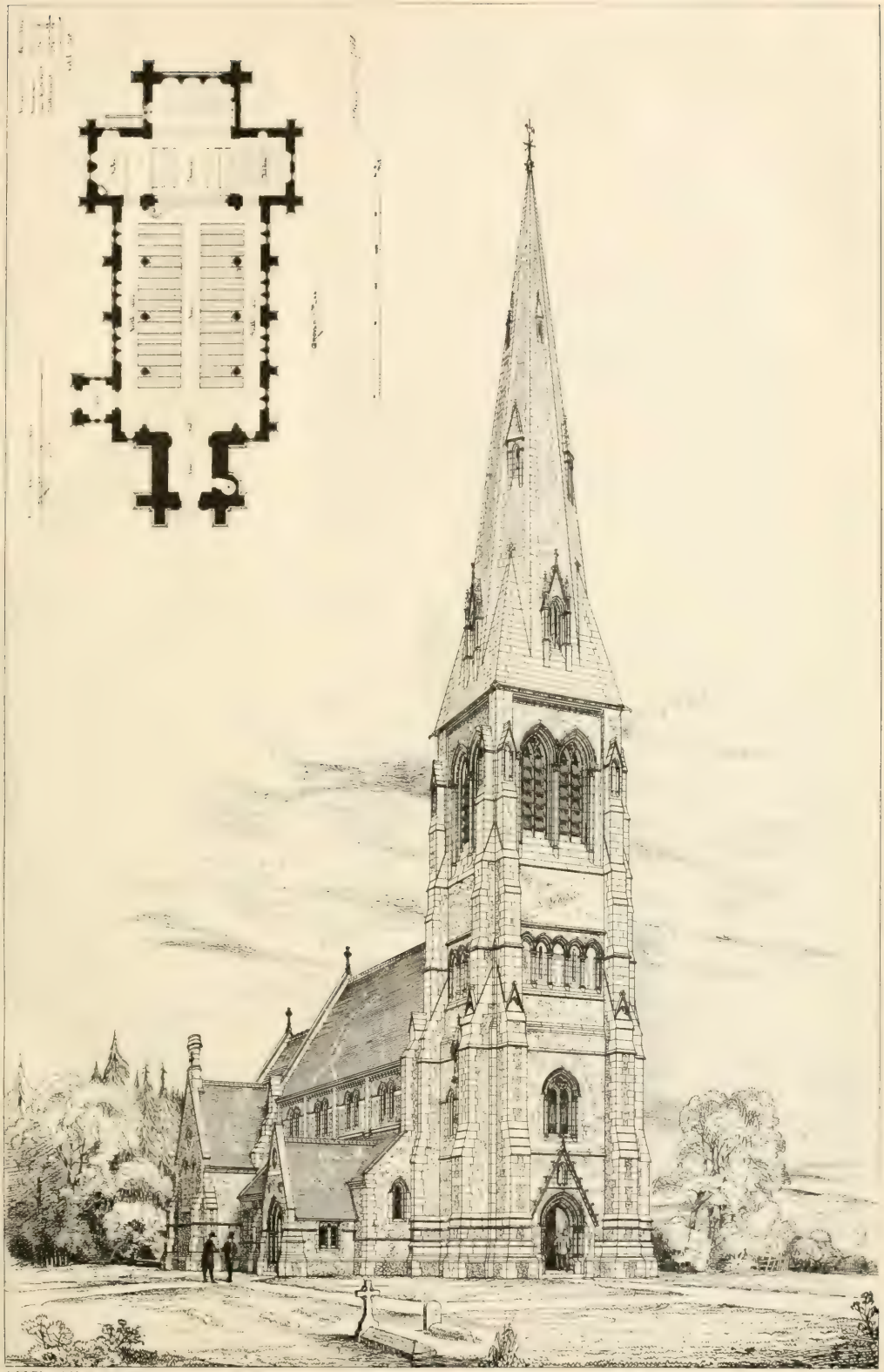
Photo-lithographed & Printed by James Akerman 11 Queen Square W.C.

PRUDENTIAL ASSURANCE COMPANY OFFICES HOLBORN

TERRA COTTA DETAILS OF DORMERS

A. WATERHOUSE A.R.A. Architect





A W Blomfield M A Architect

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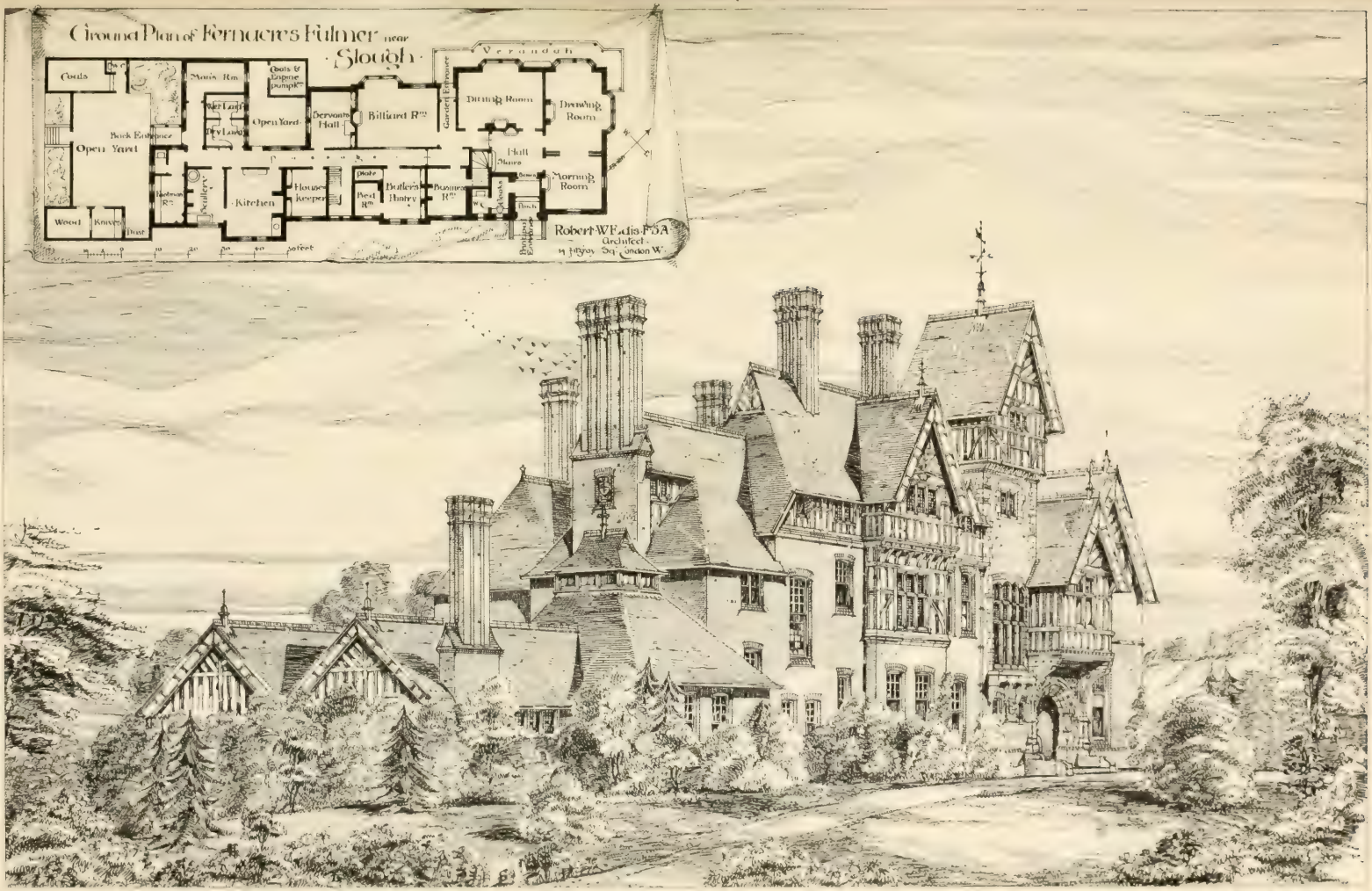
CHURCH OF THE HOLY TRINITY. PRIVETT, HANTS.


Ground Plan of Fernacres Fulmer near Slough
Coals
Coals & Engine pumps
Main Rm
Ale Lodge
Ale Lodge
Open Yard
Back Entrance
Open Yard
Servants Hall
Billiard Rm
Garden Entrance
Verandah
Dining Room
Drawing Room
Hall
Stairs
Morning Room
Plate
Butler's Pantry
Pantry Rm
Bed Rm
House Keeper
Kitchen
Scullery
Bedroom Rm
Wood
Knives
Dust
Back Entrance
Robert W. Edis F.S.A. Architect
14 Hyde Park Gardens London W.
10 20 30 40 50 feet

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ILLUSTRATIONS.

NEW OFFICES OF THE PRUDENTIAL ASSURANCE CO.—BUSINESS PREMISES AT SHOREDITCH—HOLY TRINITY CHURCH, PRIVETT, HANTS—CAVENDISH COLLEGE, CAMBRIDGE—FERNACRES HOUSE, FULMER, NEAR SLOUGH.

OUR LITHOGRAPHIC ILLUSTRATIONS.

NEW PREMISES FOR MESSRS. CLARK AND HUNT, 159 AND 160, SHOREDITCH.

THE decision of the Metropolitan Board of Works to widen High-street, Shoreditch, rendered it necessary to pull down the front portion of the premises then occupied by Messrs. Clark, Hunt, and Co., wholesale ironmongers and stove and range manufacturers, who thereupon determined to pull down the whole of the premises and erect new and more commodious buildings upon the remainder of the site, including therewith the adjoining plot of land, which was then vacant. The various spacious floors are constructed for carrying great weights, the ground floor being fitted up as a store for all classes of ironmongery. The offices of the firm are also on this floor. The first floor is a show-room for the display of Abbotsford stoves, marble chimney-pieces, close and open fire ranges, &c., the second and third floors being used as store-rooms for the class of goods in which this firm trades. In the basement are stored large quantities of nails, rainwater castings, &c. The new buildings, which are of a most substantial character, are executed chiefly in brick—Fareham red facings, with a small portion of red Corshill stone and red terra cotta, being used in the principal front. The roof is covered with Brosely tiles. Messrs. Clarke and Bracey are the builders, whose contract was £5,116. The architects are Messrs. Driver and Rew, of Victoria-street, S.W.

CAVENDISH COLLEGE, CAMBRIDGE.

WE illustrate this week Cavendish College, Cambridge, a new wing of which was opened on May 22nd by Dean Stanley. The part erected and opened some two years ago by the Duke of Devonshire (who gave his name to it), was sufficient to accommodate about 70 students, and the necessity soon arose for an enlargement. When complete the college will accommodate 300 students besides tutors, and residences for warden and sub-warden. Economy has been studied throughout, both in the architecture of the building itself and its general arrangements. The plan is that of a number of single rooms to be used as bedrooms and for private study, in addition to the large rooms in common, libraries, dining hall, &c. Cavendish College is intended, to some extent, to solve the vexed question of university extension—1st, by enabling students somewhat younger than ordinary undergraduates to pass through a University course and obtain a degree. 2nd, to train in the art of teaching those students who intend to become schoolmasters. 3rd, to offer to parents and students the advantage of a wise economy. The cost to each student is under £100 per annum, which gives three terms of residence, in each of the three years, during which the student must remain to obtain his degree. The cost of the buildings already erected, and occupied by a number of students, is about £13,000. The number capable of being accommodated is one hundred, beside wardens' and tutors' apartments, kitchen offices, &c. The architects are Messrs. John Giles and Gough, of Cravenstreet, Charing-cross, and the builder Mr. Sharman, of Bishopgate-street, London. The drawing from which our illustration was taken is now on view at the Royal Academy.

FERNACRES, FULMER, NEAR SLOUGH.

WE illustrate this week the entrance front and plan of this house, which has lately been erected from the designs and under the superintendence of Mr. Robert W. Edis, F.S.A., architect, of 14, Fitzroy-square. Owing to the principal views being to the north-west and north-east, and to the peculiarities of the site, special arrangement of plan was found necessary. The house is built of red brick, with half timber and tile hanging in portions of the upper part, and the works have been well and satisfactorily carried out from the designs of the architect by Mr. E. Conder, builder, of Kingsland-bridge-road, London.

CHURCH OF THE HOLY TRINITY, PRIVETT, HANTS.

THIS church replaces a much smaller edifice of no architectural character or interest. The new building has no peculiarity of plan, consisting simply of nave, aisles, and chancel, with transepts, and a tower and spire at the west end. The external facework is of rough flint, with which the neighbourhood abounds. The whole of the external dressed stonework is of Doulting stone. Internally Bath stone has been used for columns, arches, and other details, the general face being lined with Ham-hill stone, banded with Bath. Up to the sills of the aisle windows the walls are lined with rubbed Corsehill stone, finished at the top with a moulded string-course. The interior of the church is treated in a much richer manner than is indicated by its external details. All the detached shafts used in the chancel are of Purbeck marble, as also are the slab of the super-altar, the top of a recessed tomb in the chancel, in memory of a sister of the founder, and the seats of the sedilia. The roofs are of pitch pine, covered with Broseley tiles. The whole of the floors are of Italian mosaic, executed by Messrs. Burke and Co. That in the chancel is of somewhat elaborate design, with plaques of marble and porphyry introduced in the sanctuary. All the steps in the chancel are of Belgian marble. The reredos occupies the whole of the east wall, and forms part of the architecture. It consists of an interlaced arcading, having in the centre a larger arch containing a sculptured representation of the Supper at Emmaus. The windows in the chancel and the west window in the tower are filled with stained glass by Messrs. Heaton, Butler, and Bayne; those in the chancel being the gift of the two sisters of the founder. The pulpit is of Caen stone, with Purbeck marble shafts. The font (a special gift) is of Bolsover stone; the plan is square, the sides being richly carved, and it is supported on clustered shafts of Purbeck marble. The whole of the sittings and fittings and the doors are of oak. The organ, which is placed in the north transept, is by Lewis. Under the chancel and transepts is a crypt, in which is placed the heating apparatus. In the tower is a peal of eight bells. The contractors for the works were Messrs. Dove, Bros., of Islington. The carving was executed by Messrs. Farmer and Brindley. The height of tower and spire is about 180ft. The cost of the whole work has been defrayed by W. Nicholson, Esq., of Basing Park.

OFFICES OF THE PRUDENTIAL ASSURANCE COMPANY.

WE have received no description of this new building to accompany our illustrations, which are in continuation of those we gave last week. We have already described the structure and its principal feature—the successful combination of brick and terra cotta—in an article entitled "Building in Terra Cotta," which appeared on p. 353 of our last volume (April 5, 1878).

William Marshall Hunt, builder, formerly of St. Sidwells, was last week sentenced to six weeks' imprisonment at Exeter, for having fraudulently failed to deliver up all his property to the trustee in bankruptcy.

On Sunday, the new Catholic church, which has been erected in Caroline-street, Wigan, and dedicated to St. Joseph, was opened. The church, which is designed by Messrs. Goldie and Child, consists of nave and aisles, giving a total length of 87 feet, by a total width of 60ft. 6in. The presbytery immediately adjoins the church, and its simple façade harmonises well with that of the latter. The contract for the whole block was £5,647.

THE ARCHÆOLOGICAL CONGRESSES.

THE two great archæological societies have just issued their programmes, showing the districts proposed to be visited in their annual excursions. The areas selected for the congresses of 1878 are much nearer London than were those of last year, and not far removed from one another—Northampton being the headquarters for the Institute meeting, and Wisbech that of the Association.

The Royal Archæological Institute meets on Tuesday, the 30th inst. The great fire of 1675 destroyed most of the domestic buildings in Northampton, but there are left a splendid example of Transitional Norman in St. Peter's Church; low circular towers, and other remains of an early castle just outside the borough; St. Sepulchre's Church, in the centre of which are embedded fragments, more or less restored, of a "round" Templars' church; the large cruciform church of St. Giles, and an almshouse known as St. John's Hospital (founded 1137), containing some rude local carving, and a little stained glass. Within two miles of the town is the exquisite Queen Eleanor's Cross, and the visitors to it will have the opportunity of considering the manner in which the Queen Anne period restorers respected 13th century architects' intentions. Not far from here is "Dane's Camp," Hunsborough-hill, which may form a *crux* to advocates of the British, Roman, Saxon, or Danish origin of these rude earthworks. The etymology suggests discussions wide rather than conclusive. Amongst outlying places to be visited are Althorpe Church, a quarry of examples of every style from very Early English to debased Perpendicular; Althorpe Hall, rich in pictures by the old masters, and in statuary; Spratton, a Norman church, and the unique church of Brixworth, "basilican" in plan, with long and short work, plentiful brick arches, and other reputed Saxon features, a crypt at east end, and singular circular turret attached to face of tower. Another day's excursion is to bootmaking Wellingborough, and to the Early church of Irchester and the adjacent Roman camp, and to the fine churches at Rushden and Higham Ferrars, where the party divide—one section visiting the grand group of 14th-century spired churches at Raunds, Stanwick, Irthlingborough, and Finedon; the other proceed to Thrapston and its hermitage on the bridge, Islip, and Loweck, and to the singular Elizabethan house of Drayton. Another afternoon is to be occupied by visits to the best known of the "Saxon" churches, that of Earl's Barton, and from thence to the Marquis of Northampton's seat at Castle Ashley, an Elizabethan structure altered by Inigo Jones, and the late 15th century churches in that village and at Whiston, where also is a manor-house, known as King John's, returning by Cogenloe, where is an Early English church. The market town of Kettering, with its fine church, is to be inspected on the Saturday, an excursion being made from that town to Bothwell Priory, Rushton Hall, with its triangular lodge, the hexagonal Eleanor Cross at Geddington, Kirby, and the great castle and partly-ruined church of Rockingham. On Monday Cotterstock, a Roman station, and the scanty traces of Fotheringhay Castle, will be visited from Oundle, and one-half the party will proceed to see the Early church of Barnack and the art treasures of Burleigh House; and the second half to Peterborough, where the Cathedral, the great Church of St. John, and the quaint Elizabethan market-house, suggest a busy afternoon's work. On the closing day, Tuesday, August 6th, it is proposed, if the railway be opened, to go to Canon's Ashley. To the students of mediæval sculpture, armour, and heraldry, this visit to the county which Britton declared "excelled any other part of the kingdom of equal extent, excepting London, in its sepulchral monuments," will be one of interest and profit.

The Archæological Association's congress in the Fen Country is arranged to take place between Monday, August 19th, and Tuesday, the 27th. The town of Wisbech has not much to detain the visitors, although on the site of a Roman settlement, except the double-naved and aisled church of SS. Peter and Paul, and the vaults under Inigo Jones's rebuilding of the Castle. But in the half-dozen counties uniting

in the Fen district there are some noble specimens of mediæval architecture. The programme provides for a day to be spent in the examination of Ely Cathedral, and two others in perambulation of the colleges, churches, and old houses of Cambridge. At King's Lynn the dissimilar twin towers of St. Margaret's Church will suggest inquiry, and the ruins of Greyfriars' octagonal tower, and the south gate will repay examination; a promise is held out of the exhibition of the ancient charters and the quaint regalia of the borough. The magnificent priory and castle ruins at Castle Rising, the abbey and triangular bridge at Thorney, the castle ("Towers") of Middleton, Thorney Abbey, Spalding Church and cell are amongst the features of interest suggested by the Association's programme, and it is possible a visit may be paid to the Prince of Wales's seat at Sandringham. We understand the intended journeys to the city of Peterborough and Burleigh House will be struck out of the agenda, as they will form features of the Institute's meeting three weeks earlier.

The memorial stone of a new Baptist chapel was laid near Goudhurst, on the 25th ult. The buildings consist of a chapel, with external porch, vestries, school, boiler-room, and latrines. The building is in the Gothic style, faced externally with local clamp bricks of a dark colour, the bays and buttresses being executed in red brick and the copings, arches, strings, sills, and plinths being in plain and moulded white bricks; stone being sparingly used. The builder is Mr. Miles Tully, of Tudely, Tunbridge, and the architect Mr. Wm. Theobalds, of London.

Excavations are being made on the summit of Cæsar's Camp, Folkestone, under the personal superintendence of General Fox, Lord Radnor having given permission, on the understanding that everything found should be placed in the Folkestone Museum. The extraordinary discovery has been made that the structure is neither British nor Roman, but Norman. An ancient well has been opened to a depth of eighty feet, and a coin of the reign of Stephen, a broken bone flute and some pieces of pottery have been found.

The memorial stones of a new Baptist chapel at Ottery St. Mary, Devon, were laid on Wednesday week. The architects for the new building are Messrs. Packham and Croote, Paris-street, Exeter, and the builder Mr. Edward Carnell, Ottery.

The Town Council of Canterbury accepted, on Wednesday week, the tender of Mr. Hill for the repair of the towers of Westgate, an ancient gateway which spans the main street. They also granted the use of the chapel in the towers for the storing, by the museum committee, of patents and other documents.

A bust of the Irish composer, Michael William Balfe, was unveiled in the Irish portrait chamber of the National Gallery, Dublin, on Saturday. The bust is of marble, and was executed by Mr. Thomas Farrell, R.H.A.

A painted window has just been placed in the Hempstead Church, near Gloucester. It represents incidents in the life of St. John the Baptist. Messrs. Camm, of Birmingham, were the artists.

The county magistrates of Gloucestershire have purchased for £12,100 an estate at Barnwood, as the site of a proposed new county pauper lunatic asylum, the plans for which are to be prepared by the county surveyor.

The Newhaven harbour trustees are about to build a new iron bridge at Southease from plans to be prepared by Mr. H. E. Wallis, of Westminster Chambers, who has recently carried out several county bridges for the West Sussex magistrates.

The Portsmouth Town Council have confirmed the appointment of Mr. Adames, who for six months has been acting borough engineer, and have voted to him an annual salary of £400 a year. At the same meeting a letter from the sureties of Mr. Quick, contractor for the new asylum, was considered, in which it was stated that men would not work at the building at town rates of wages on account of its distance from the town. They asked therefore that the council and Mr. Quick should divide the expense (estimated at £1,000) of giving an additional 1d. an hour to those on time work. This the council declined to accede to, a resolution being passed empowering the authority under the 17th clause in the contract to enter the premises and execute the work themselves, at the contractor's expense.

At the county of Cumberland Pauper Lunatic Asylum at Garlands, a new superintendent's residence is in course of erection from the plans of Mr. J. A. Cory, county surveyor. Mr. Cory's plans for new workshops, preparatory to an enlargement of the asylum, were approved by the county magistrates last week, and tenders have been invited for the work.

Our Office Table.

FROM the list of subscriptions already obtained by the Scott Memorial Committee, it seems more than probable that the original scheme of founding an art workman's teachership at the Royal Architectural Museum in memory of its founder, the late Sir Gilbert Scott, will be realised. Mr. Geo. Edmund Street, R.A., has undertaken to design the memorial brass, which is to be placed over the grave in Westminster Abbey. This will be proceeded with at once. As the advantages of the Pugin Studentship have been so evident in the case of architectural students, it is certainly to be hoped that the intended teachership for art workmen will be thoroughly well supported. At present the latter are unprovided for, excepting by the schools of art in connection with the Science and Art Department, but as every one knows, the technical instruction given in these schools is by no means equal to the wants of, or of the kind required by, the strictly architectural craftsman, admirable as it may be in its way. We see several well-known architects' names on the list of donations, and we should like to see more.

THE annual meeting of the members of the North Staffordshire Brick and Tile Masters' Association was held at Trentham on Monday week; Mr. W. A. Peake, of Hanford, presiding. It appeared to be the general opinion of the members present that, although the brick and tile trade was dull, there was no immediate necessity for a reduction of prices, as it was believed trade would revive before long. The association was said to be in a flourishing condition and steadily increasing in numbers. Mr. S. Wheatley was elected president of the association for the ensuing year, and Mr. G. Boulton, of Tunstall, was appointed vice-chairman. At the close of the business meeting the customary dinner was held; Mr. W. A. Peake occupied the chair, and Mr. J. N. Peake acted as vice-chairman. Mr. W. Brough (Silverdale) proposed "Success to the Brick and Tile Trade of North Staffordshire." He said that at present trade was not so brisk as they would like to see it, but in his opinion there was a reasonable prospect of it improving before long. Mr. Lees (Tunstall) responded. The vice-chairman said, as the members were no doubt aware, it was intended to consolidate the Factory Acts, and he was told that the Government purposed putting this trade under the Brickfields Act, as had been attempted once before. As it was important to the trade that this should not be done, being in London at the time, he waited upon Mr. Heath on behalf of the association, and explained the matter to him. Mr. Heath received him very kindly, and accompanied him to the proper authority, by whom he was assured that it was not the intention of the Government to interfere with the trade in any way. He thought that the association should recognise the kindness of Mr. Heath, and therefore he moved that the secretary convey to that gentleman the thanks of the meeting for the assistance he had rendered to a representative of the association in a matter connected with the Factory Acts.

THE following are the Royal Academy admissions to the Architectural School:—*Students of Upper School:* F. Baggallay, R. W. Collier, H. B. Cullerne, A. Frampton, R. W. Gibson, J. H. Ince, A. Filtman, O. C. Wylson. *Students of Lower School:* J. B. Bare, J. H. Buckeridge, A. D. Gregg, T. G. Howell, C. Howse, J. M. Jones, F. Miller, G. Petrie, G. Wheelhouse. *Probationers:* E. J. M. Allen, O. J. Bradley, F. Dickson, T. Gordon, T. E. Hatch, C. E. Holmes, J. J. Jones, M. J. Lansdell, T. C. Lees, A. J. Murray, J. B. Phillips, C. A. Smith, T. B. Whinney.

WITH a view to the solution of the artisans' dwellings question, Mr. Thomas J. Perry, architect, Colmore-row, Birmingham, has just completed a set of designs and plans for a block of artisans' dwellings, arranged on the flat system, and suitable for erection in the more populous parts of large towns. Mr. Perry will be happy to show them to any feeling interested in the Birmingham improvement scheme or the general subject of artisans' dwellings. The elevation represents a block of buildings, 187ft. in length and 52ft. in height, in four stories. The exterior material is principally red brick; the windows having stone lintels and sills. Each dwelling is complete in itself, and contains a large living room, two chambers, scullery, pantry, and coal-house. A separate supply of water and gas is provided for, and all sanitary requirements are so met as to promote the greatest cleanliness with a minimum of trouble. The floors are constructed of iron and brick, and covered with quarries, timber only being used for chamber floors, doors, window frames, cupboards, and shelves. The roof being flat may be used as a drying place or playground. The rentals are calculated at from 7s. to 5s. per week, according to the size of the rooms and the story they are upon.

THE new National Opera-house, according to reports in different journals, is to be proceeded with at once, but we can hardly give credence to the statement. Indeed, we have only recently seen a design for converting the portion already built, and for finishing the building, as a block of first-class mansions, in flats, for a limited liability company, Mr. John Whichcord, F.S.A., being the architect engaged. The name proposed for the building is St. Stephen's Mansions, and the architecture employed, although following, of course, the present lines of the substructure, is shown more after the style of St. Stephen's Club adjoining, a building by the same architect.

Burton parish church was reopened after restoration a fortnight since by the Bishop of Winchester. The whole of the building has been renovated, with the exception of the west tower, and stained glass has been introduced into the east window, and one in the south aisle, as memorials. The work was carried out by Messrs. Lewis and Son, builders, of East Meon, under the direction of Mr. A. Blomfield, M.A.

The Preston Town Council, on Wednesday week, appointed Mr. Hudson Reah as borough surveyor in the place of Mr. Hunter, at a salary of £600 a year. Mr. Reah was assistant-surveyor of Sunderland from 1862 to 1866, since which period he has been borough surveyor and waterworks engineer for Darlington. The other selected candidate was Mr. E. Buckham, borough surveyor of Ipswich.

The Local Board of Bridlington exhibited, at their town hall on Tuesday and Wednesday, the schemes, with plans and specifications, &c., thereto appended, sent in in competition for a premium of £100, for the best mode of draining the district. The selected plans have not yet been announced, but we understand the local board made up their minds before the exhibition was opened.

The burial board of the city of Ely accepted, on Tuesday, Mr. W. Jefferson's tender for works of painting, and Mr. W. T. Holmes's tender for the erection of new entrance gates at the cemetery.

A new assembly room at Wainfleet, near Boston, was opened on Wednesday week. Mr. R. H. Dunkley was the builder, for Mr. Cash, the proprietor.

The foundation stone of a new Wesleyan chapel was laid at Falsgrave, Scarborough, on Friday. It will be Gothic in character, and will measure 52ft. by 35ft., and 26ft. high from floor to ceiling, 45ft. high externally. Pitch-pine seats, stained and varnished, will accommodate 200 persons, and at the rear will be a school-room 50ft. by 25ft., which can be thrown into chapel by removal of partition, so increasing accommodation to 500 sittings. Mr. D. Petch is the architect; Mr. F. Horner is contractor for brick and stonework, and Mr. Wade for joinery. The total cost will be about £2 200.

The Tunbridge Wells improvement commissioners decided on Wednesday week to carry out drainage and sewerage works in the Bishop's Down and Neville-park district in accordance with plans prepared by their surveyors. The estimated cost is £1,255.

The River Witham Commissioners, at their meeting at Boston, on Tuesday last, resolved to ask Mr. Williams, C.E., to report on the steps necessary to be taken for the improvement of the river Witham and outfall, with the view of preventing the flooding of the adjacent districts.

Memorial stones of a new Primitive Methodist chapel, to seat 220 people, were laid at Wickersley, near Rotherham, on Monday week. Messrs. J. Kerridge and Sons, of Wisbech, are the architects, and all the contracts have been taken by Mr. H. Flowitt, of Doncaster.

On Friday week the joint committee of sanitary authorities, appointed for the purpose of carrying out the Crummock water scheme, met at Workington, and accepted tenders for the works, amounting in all to £23,700. The cost of land-purchase has been £900 more, and the total outlay will probably be within the estimates.

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DRAWINGS RECEIVED.—B. and R.—A and K.—H. G.—H. B.—O. P. E.—A. S. K.—T. M.

C. J. BELL. (Direct from the publishers only, we believe.)—HONEST INDIGNATION. (It is not "quite evident that the referee's report has been distorted." If you like to write a letter, simply challenging the conduct of those who invited the competition, we will insert it *with your real name*, but we see no reason for impugning the conduct of the referee, and this your letters do, although only indirectly. The weak point in the competition was undoubtedly that to which we have directed attention, but the competitors accepted the necessary consequences, and should have borne them.)

VERITY BROTHERS.

Patent Ventilator or Air-Propeller, for the introduction of Cold or Warm Air into Dwellings, &c.

The Machine may be seen in action at their Showrooms, 127, Regent-street, London, W.

The apparatus consists of a drum with a double set of fans, which are worked by a fly-wheel placed in the centre, and on the same axle as fans. The motive for this fly-wheel is arrived at by a small jet of water being directed on to it, causing both the wheel and fans to revolve with great velocity, the air passing through the machine at a rate equal to 2,500 feet per minute, if desired, according to size of apparatus.

N.B.—The above Machine may be used either as an exhauster or injector, as may be preferred, or both objects combined.

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These SLATES are of a grey-green tint, are stout, and made in all sizes. A large stock available for immediate delivery. For further particulars (with a list of important buildings covered) apply to the MANAGER, Clynderwen, R.S.O., Carmarthenshire.—[ADVT.]

Holloway's Pills are the sheet anchor of the confirmed dyspeptic, a few trials will prove their potency in removing indigestion, biliousness, costiveness, eructations, loss of appetite, wind in stomach, and that utter weariness which always wears on a weak and disordered stomach. They act as alteratives, sedatives, and gentle aperients.

Seven Hundred and Fifty Illustrations of Builders' Requirements, representing Stoves, Ranges, Locks, Hinges, Screws, &c. by F. W. REYNOLDS & CO., 73, Southwark-street, London, S.E.—Price 5s. free by post, and allowed off on purchase of first parcel.—[ADVT.]

Helliwell's Patent System

OF AIR and WATER-TIGHT GLAZING, WITHOUT PUTTY, and without exposing any outside woodwork to paint, and NEW SYSTEM of COVERING ROOFS.

The fasteners are brass or copper. The peculiar arrangement of the glass covers the whole of the woodwork, and only the small fastener is visible; therefore the roof is indestructible, and outside painting unnecessary. The squares of glass can be easily removed, and the whole taken out and cleaned by any inexperienced person. Breakage is impossible except through carelessness or accident.

The glazing is more air-tight than the old putty system, yet any amount of ventilation can be given.

Old roofs may be re-glazed on this principle, and roofs are covered with slates or zinc on this system.

Extract from BUILDING NEWS: "Mr. T.W. Helliwell, of Brighouse, has recently patented and introduced a new system of glazing and covering roofs, which is certainly superior to anything of the kind we have seen before . . . . and it will, in our opinion, supersede any other system before the public."

Important references and all particulars from the patentee, T. W. HELLIWELL, Brighouse, Yorkshire; and 19, Parliament-street, London.—[ADVT.]

CHIPS.

The Hambleton-by-Garstang School Board at their last meeting appointed Mr. J. A. Seward as their architect, and afterwards accepted Mr. Thomas Hall's tender for the erection, from plans recently prepared by Mr. Seward, of a school for 66 children.

The Surrey county magistrates have instructed a committee, assisted by the county surveyor, to consider and draw up rules for the prevention of, and as precautions against, the outbreak of fires in the music-halls in the county.

The Court of Common Council of the City have referred to a committee a project for removing Newgate gaol and utilising the site for building purposes.

New board schools to accommodate 250 scholars are about to be built by the Swinton School Board at Kilnhurst. Messrs. Wilson and Masters, of Sheffield, are the architects.

The Queenstown Town Commissioners have accepted the tender of Mr. J. T. Rooney for the completion of the boundary sewers, within two months, to the satisfaction of the town surveyor.

New brewery premises have been erected at Whittle Springs, Chorley-lane, for Messrs. Gardiner, Thompson, and Cardwell, by Messrs. Bromley, Heald, and Co., contractors.

The Blackburn Town Council have accepted the tender of Mr. James Whittaker for the erection of new municipal offices; that of Messrs. Fotherby for sewerage works in Hole House district; and that of Mr. Sam Counsell for sewerage in Preston New-road.

At a recent meeting of the burial board for Langport, Somersetshire, it was decided to instruct Mr. Hall, of London, the architect for the board schools in that town, to prepare alternative plans for the cemetery—with one and two chapels respectively.

The tender of Mr. Coles, at £5,200, has been accepted for the erection of the new church of St. Mildred, Burnt Ash, Lee, Kent (exclusive of tower), from the plans of Mr. Henry Elliot, architect.

TENDERS.

BIRR.—For additions and alterations to St. Brendan's Church, Birr. Mr. Thomas Drew, R.H.A., architect; quantities by Mr. J. McD. Bermingham:—
Beckett, J. and W. (accepted) ... £1,104 17 8

BLACKBURN.—For the erection of new municipal offices for the town council, Blackburn:—
Whittaker, James (accepted)

BOW.—For the erection of five shops in the Bow-road. Messrs. W. Waymouth and Son, architects:—
Shurmur £1,647
Wyeth 1,535
Niblett 1,520
Sawyer 1,444
Sheffield and Prebble (accepted) 1,273

BURNLEY.—For the supply of iron water pipes required for the new water main extension by the town council of Burnley, Lancashire:—
Stavoley Iron Company (accepted) ... £5,000

CANTERBURY.—For the repair of the towers of Westgate, in High-street, Canterbury, for the town council:—
Cozens, J. P. £55 0 0
Wiltshier 53 10 0
Hills, H. (accepted) 51 15 0

CITY OF LONDON.—For rebuilding Anderton's Hotel, Fleet-street. Messrs. Ford and Hesketh, architects; quantities by Messrs. Gardner, Son, and Theobald:—

	General works.	Proposed additions.	Total.
Kirk and Randall ...	£27,479	£1,018	£28,497
Adamson and Sons	27,245	746	27,991
Shaw	27,016	957	27,973
Ashby and Horner...	26,945	935	27,880
Brass	27,153	702	27,855
Peto Bros.	26,840	861	27,701
Ashby Bros.... ...	26,699	848	27,547
Nightingale... ...	26,619	854	27,473
Rider and Sons ...	26,648	720	27,368
Scrivener and Co. ...	26,520	845	27,365
Conder	26,455	847	27,302
Brown and Robinson ...	26,200	837	27,037
McLachlan and Son	26,240	796	27,036

CITY OF LONDON.—For rebuilding two warehouses, Aldermanbury. Messrs. Ford and Hesketh, architects; no quantities:—
Crabb (accepted) £2,911

CROYDON.—For alterations and additions to house, Chichester-road, Park-hill, Croydon, for C. A. Brassert, Esq. Mr. Horace P. Bonner, architect, Lewisham:—
Hooker £688 0 0
Hobbs (accepted)... ... ... 593 10 0

DARENTH, KENT.—For various works at the School for Imbecile Children for the managers of the Metropolitan Asylum District. Messrs. A. and C. Harston, architects, 15, Leadenhall-street, E.C.:—
Accepted tenders:
Perry and Co. (joinery fittings) £639
Kirk and Randall (entrance gates, &c.) ... 360
Hammer (school furniture and fittings) ... 150

DUBLIN.—For alterations and additions to St. Mark's Ophthalmic Hospital, Lincoln-place, Dublin. Mr. Thomas Drew, R.H.A., architect; quantities by Messrs. Patterson and Kempster:—
Pemberton, T. (accepted) £1,800

DUBLIN.—For additions to Alexandra College, Earlsfort-terrace, Dublin. Mr. Thomas Drew, R.H.A., architect; quantities by Mr. J. McD. Bermingham:—

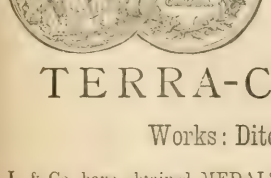
	Section 1.	Section 2.	Section 3.
Hall and Son ...	£1,397 17 6	£491 15 0	£1,295 14 0
J. & M. Beckett...	1,425 0 0	416 0 0	1,094 0 0
Pemberton, T. ...	1,405 4 0	372 1 3	967 17 3
Pile, J. P. ...	1,310 0 0	390 0 0	820 0 0
Collen, Bros. (ac.)	1,264 8 0	359 18 8	844 17 7

DUBLIN.—For additions to the Church of St. Philip, Milltown, Dublin. Mr. Thomas Drew, R.H.A., architect; quantities by Mr. J. McD. Bermingham:—
Tighe, T. £1,611 0 0
Beckett, J. and W. 1,570 0 0
Moon, L. 1,520 0 0
O'Leary, J. (accepted) 1,179 10 0

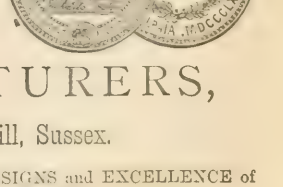
DULWICH.—For road making and sewers for the British Land Company, Limited, on their estate at Dulwich. Mr. Henry B. Mitchell, surveyor:—
Harris (accepted)... ... ... £942

ROTHERHAM.—For building a retaining wall and other works for the town council of Rotherham:—
Dabb and Gummer (accepted) ... £1,923 11 3

LONDON. PHILADELPHIA.



JOHNSON & CO.



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FINNINGHAM.—For the erection of a granary, &c., near the railway station at Finningham. Mr. Hubert, Ipswich, architect:—

Gibbons, Ipswich...	£975	0	0
Cunnold, Ipswich...	937	0	0
Crowe, Stowmarket	763	0	0
Coe, Ipswich	740	0	0
Smith and Welham, Ipswich	711	0	0
Snell, Woolpit	647	16	6
Rednall, Stowmarket	608	5	9½
Bird and Gostling, Stowmarket ...	587	10	0
Andrews, F., Haughley (accepted) ...	555	0	0

FOREST-ROW.—For the erection of a cemetery chapel at Forest-row, Sussex, from designs by Herbert J. Green, Esq., architect, 24, Lincoln's-inn-fields, London, W.C.:—

Gonie, E.	£367	18	0
Martin and Quickenden	299	0	0
Charlwood Bros.	256	14	9
Morris, J. (accepted.)	254	0	0

HANS PLACE, S.W.—For new north aisle to St. Saviour's Church, Hans-place, for the Rev. G. W. Weldon and the churchwardens; Mr. E. P. Loftus Brock, F.S.A., architect:—

Brass, J. H.	£2,895
Pink and Son	2,857
Dove, Brothers	2,675
Mattock Brothers	2,473
Haynes	2,250
Stimpson	2,248
Bowman and Scowen	2,100

HASTINGS.—For new ornamental parade seat at West Marine for the Hastings Town Council:—

Lambert, R. M., Hastings	£96	0	0
Foster, S., St. Leonards	87	10	0
Hughes, C., St. Leonards (accepted) ...	83	10	0

HUNTINGDONSHIRE.—For alterations to the hospital of the Hunts Militia Barracks for the county magistrates of Huntingdonshire:—

Lord, G.	£250		
Thackray, G.	250		
Richardson, G.	219		
Howard, J....	228		
Balmer, J. (accepted)	224		

KENSINGTON.—For works of painting and repair to the workhouse and infirmary for the Kensington Board of Guardians. Messrs. A. and C. Harston, surveyors:—

Lemon, Frank H.	£2,507	14	0
Lucas and Son	2,178	0	0
Bool	1,908	5	9
Lathey, Brothers	1,840	0	0
Harrison and Wood	1,624	0	0
Chapman...	1,486	19	2
Lewis, C....	1,402	17	0
Turrell, J.	1,337	0	0
Whitford, R.	1,218	0	0
Galton and Co....	1,176	0	0
Cross, Chas.	1,154	0	0
Derby, A. W. (accepted)	1,104	0	0

[Surveyor's estimate, £1,350.]

LAMBETH.—For the erection of new infant school, classrooms, and outbuildings to All Saints Schools, York-street, Lambeth. Mr. S. C. McMurdie, architect; quantities supplied:—

Tarrant and Sons...	£836
Canning and Mullins	827
Phelps and Rice	816
Marsland	808
Gibbon and Mitchell	795
Cullum	745

MILE END.—For alterations to shop, No. 536, Mile End-road. Messrs. W. Waymouth and Son, architects:—

Gregar	£85
Niblett	73
Shurmur	72

TYNE RIVER.—For the supply of the whole of the granite ashlar required for the Coble Dene Dock for the Commissioners of the river Tyne:—

Freeman, William and J. R., of London and Penryn (accepted)	£16,500

WANDSWORTH.—For new house at the Brown Animal Sanatory Institution, Wandsworth-road, for the Senate of the University of London. Mr. J. Slater, B.A., architect:—

	House and offices.	Fence wall, &c.
Snelling, F....	£944	£40
Gill, F.	839	64
Ashwell and Stevenson	830	75
Sheffield and Prebble (accepted)	773	64

HAMBLETON.—For the erection of a school for 66 children, for the School Board for Hambleton. Mr. J. A. Seward, architect to the board:—

Hull, Thomas (accepted)

MULLINGAR.—For re-roofing and re-pewing Mullingar Church, Co. Westmeath. Mr. Thomas Drew, R.H.A., architect; quantities by Mr. J. McD. Bermingham:—

Hague, H. (accepted) £1,300

SALISBURY.—For additions to the national schools at Fisherton-Anger. Mr. Fred Bath, architect; quantities supplied:—

Hopkins and Son	£598	10	0
Plowman	540	0	0
Sawkins	531	0	0
Tryhorn	490	0	0
Williams	465	0	0
Harris (accepted)...	448	0	0

SEAFORD, EAST SUSSEX.—For the erection of new schools for girls for the Seaford School Board:—

Burgess, Seaford	£1,068	10	0
Langley, Turner's-hill	819	0	0
Morling, Seaford (accepted)	755	17	10

TUNBRIDGE WELLS.—For works of paving, &c., in Cromwell-road, for the improvement commissioners:—

Potter, Henry (accepted)	£545	15	1

[Lowest tender received.]

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SALES BY AUCTION.

Sunningdale, Berks.—A highly desirable Freehold Estate, eligibly situate, fronting the Dale-road, Sunningdale, adjoining properties belonging to E. W. T. HAMILTON, Esq., the Hon. Mr. ASHLEY, Canon GIRDLESTONE, and the late Sir FREDERICK GRAY, abutting on the Ascot and Reading Railway, one mile from the Sunningdale Station. It comprises about 18 acres, divided into six charming sites for residences, ornamentally planted with rhododendrons and clumps of firs, with a south-eastern aspect sloping gently to the Dale-road. A deep bed of fine brick earth underlies the greater part of the property, and kilns and drying-sheds have been recently erected, and excellent bricks are now being made; thus there are rare advantages for the erection of residences in this fashionable district, which is now well known to be one of the healthiest near London.

MESSRS. DRIVER and CO. are instructed to SELL by AUCTION, at the Mart, Tokenhouse-yard, London, on TUESDAY, 23rd July, instead of the above valuable FREEHOLD ESTATE.—Particulars of Messrs. HAYES, TWISDEN, PARKER, & CO., Solicitors, 69, Russell-square, and of Messrs. DRIVER & CO., Surveyors, Land Agents, and Auctioneers, 4, Whitehall, London.

Very desirable Pleasure Farm, South Mimms, near Barnet, Middlesex, with possession.

MESSRS. SEDGWICK AND SON have received instructions to SELL by AUCTION, at the Mart, Tokenhouse-yard, London, E.C., on WEDNESDAY, July 17th, 1878, at 2 o'clock precisely, the valuable and compact PROPERTY, known as "The Wash Farm," situate in the parish of South Mimms, in a favourite residential district, within two miles of the town of Barnet, 4 from the city of St Albans, 1 by road from the metropolis, and about 2 miles from the Potter's Bar Station, on the Great Northern Railway, whence there are frequent trains to Kings-cross and the City. The premises comprise a cottage with farm buildings and several classes of rich meadow land, having extensive frontages to the main London road, and presenting good sites for the erection of one or more residences, the whole containing 70a. 3r. 32p. (little more or less). Possession may be had on completion of the purchase. Particulars with plans may be obtained at the principal Inns in the neighbourhood; at the Auction Mart, London; of Messrs. G. F. and M. ROOPER, Solicitors, 17, Lincoln's Inn-fields, Lond on, W.C.; and of Messrs SEDGWICK & SON, Land and Timber Surveyors, Estate Agents, and Auctioneers, 38, High-street, Watford, Herts.

Hertfordshire.—By order of the Mortgagee.—Adjoining the town of Sawbridgeworth.—A valuable Freehold Estate of 60 acres of highly productive, fertile land, part of which could at once be utilised for building, a further portion admirably adapted for horticulture or market garden purposes, and the remainder eligible for accommodation land for the town.

MESSRS. EDWIN FOX and BOUSFIELD will SELL, at the George Hotel, Bishops Stortford, on THURSDAY, July 18th, at 3 for 4 o'clock, in three lots, a valuable FREEHOLD PROPERTY, situate at Sawbridgeworth, near the first-class station on the Great Eastern Railway, and four miles from the capital market town of Bishops Stortford. It comprises 58a. 2r. 19p., and lies exceedingly compact behind the principal street of the town, and has consequently an important commercial value, which must rapidly develope in the future. Part adjoins Messrs. Rivers, the noted horticulturists, the soil being well adapted for the growth of flowers or fruit; the remainder is let to responsible tenants, the rent of the whole being £130 per annum, but a considerable advance may be obtained by letting in smaller tenancies. Particulars of Messrs. RUSSELL, SON, & SCOTT, Solicitors, 14, Old Jewry-chambers, E.C.; of J. L. FOSTER Esq., Solicitor, Ware; of Messrs. PATTISON, WIGG, GURNEY, & KING, Solicitors, 11, Queen Victoria-street, E.C.; at the place of sale; at the Mart; and of Messrs. EDWIN FOX & BOUSFIELD, 99, Gresham-street, Bank, London, E.C.

Kingston.—Capital sound Building Materials, in the erection of Norbiton House and premises adjoining.

JOHN DAWSON and SON will SELL by public Tender the whole of the very capital and expensive BUILDING MATERIALS comprised in the above premises, including excellent brickwork, rafters, joists, girders, and other useful timber, floor boards, doors, sashes and frames, shutters and boxings, panelling, staircases and balusters, marble and other chimney pieces, stoves and kitchen range, and useful interior fittings, pan and plain tiles, stone paving, coping and sills, quantity of good lead in flats, gutters, pipes, &c., and numerous other materials; and also the residence and buildings adjoining. The property will be open to view from Tuesday, July 9, until Tuesday, July 16, from ten to five daily. Tenders will be received up to WEDNESDAY, 17th inst., at the Offices of JOHN DAWSON & SON, 6, Norfolk street, Strand, and Surbiton, adjoining the railway station. J. D. & SON do not bind themselves to accept the highest Tender.

Sound Building Materials.—The Old Grammar School, Norbiton Kingston.

JOHN DAWSON and SON will SELL by AUCTION, on the PREMISES, by order of the Governors, on THURSDAY, July 18, at eleven for twelve o'clock precisely, in one lot, the sound and useful BUILDING MATERIALS, contained in the Old Grammar School, London-road, Norbiton (except the chapel and other reserved portions), comprising sound brickwork, tiles, York paving, zinc and lead flats, guttering and piping, oak and other timber in roof and floors, marble mantels, stoves, &c., also the numerous doors, windows, and frames, staircases, and other internal fittings, all as marked. May be viewed day prior to and morning of sale, and particulars with conditions of sale, obtained of G. BASTIN, Esq., Solicitor, Kingston-on-Thames; and of the AUCTIONEERS, 6, Norfolk-street, Strand, and Kingston.

East Barnet.—Surplus Property of the Great Northern Cemetery Company.—To Builders, Brickmakers, Manufacturers, Land Speculators, Agriculturists, and others.

MESSRS. PRICKETT, VENABLES, and Co. will SELL by AUCTION, at the Mart, Tokenhouse-yard City, on TUESDAY, July 16, at 2 o'clock precisely, in one lot, by direction of the Great Northern Cemetery Company, 47a. 2r. 3op., of valuable FREEHOLD BUILDING LAND, destinably situate, about midway between the New Southgate and Oakleigh-park Stations, with extensive frontages upon the public road leading from New Southgate to East Barnet, and abutting upon the Great Northern Railway, the distance from London being about seven miles. For brickmaking purposes this property is admirably adapted, there being an abundance of brick earth as well as gravel, which could be profitably utilised without deteriorating the value for building, while to parties desirous of erecting manufacturing or business premises, or otherwise building on a large scale, the position is undeniable, as probably arrangements could be made with the Great Northern Railway Company for granting facilities for bringing traffic on to the land. There is a small residence, chapel, lodge, and other buildings, likewise some valuable thriving shrubs, plantations, ornamental and timber-like trees on the premises, which will be included in the sale. Possession can also be obtained upon completion of the purchase. May be viewed, and particulars obtained at the principal Taverns in the neighbourhood; at the Auction Mart, City; of Messrs. HARRISON, BEAL, & HARRISON, Solicitors, 19, Bedford-row, W.C.; and of Messrs. PRICKETT, VENABLES, and Co., Auctioneers and Land Agents, 62, Chancery-lane, and Barnet, Herts.

Important Sale of a valuable Building Patent.—To Contractors, Builders, Modellers, Architects, and others.

MR. F. S. REYNOLDS is instructed to offer for SALE by AUCTION, on the premises, No. 12, Stourcliffe-street, Edgware-road, W., on TUESDAY, the 16th day of July, 1878, at 2 o'clock precisely (unless an acceptable offer be previously made), the VALUABLE PATENT for constructing and finishing concrete or brick buildings, known as JORDAN'S SYSTEM of MONOLITHIC CONCRETE BUILDING, together with the remaining stock and appliances, and a few office fixtures. Full particulars and catalogues of Mr. F. S. REYNOLDS, 81, Edgware-road, W.

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By J. DONKIN, Architectural Artist and Certified Art Master. HAMPTON TERRACE, SOUTHAMPTON.

See BUILDING NEWS," Oct. 10th, 1873; *Architect*, Jan. 15th, 1876.

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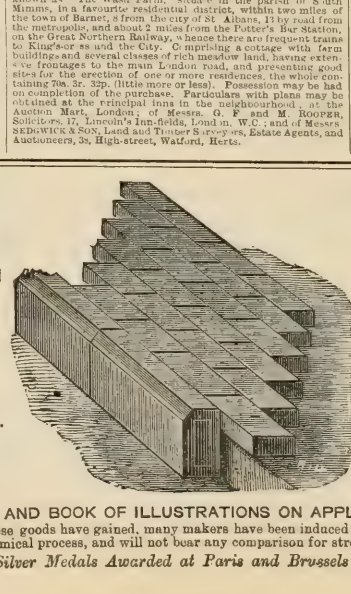

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THE BUILDING NEWS.

LONDON, FRIDAY, JULY 19, 1878.

MOUNT ATHOS AND ITS MONASTERIES.

BYZANTINE ART has its sanctuaries, so to speak, in those monasteries and convents of Mount Athos, which have been especially protected by the Treaty of Berlin. The mountain, enjoying a reputation so unique, is situated in the south of Macedonia; but its main peculiarity consists in the fact that the population is entirely composed of monks, and whose fortune it has been to be, at once, the birthplace and the last refuge of purely Byzantine Art. Many of the structures and communities, in reference to modern dates, are of a high antiquity, while some are new, but all distinguished for their curious collections of paintings. Many of these, no doubt, have their parallels in Italy; but the prototypes of all belonging to this singular school—if school it can be termed—are to be found on the Holy Mountain, as it is styled by the religious fraternities themselves. There, at any rate, its purest traditions survive, even if the existing race of painters be no more than one of copyists or imitators, whose commissions are generally for the decoration of gew-gaw Greek churckes in the European East. Regarded from an architectural point of view, the monastic buildings wherein these treasures are contained can claim no admiration, or, at all events, very little. At a distance they appear like so many white fortresses scattered up and down the slopes of a lofty hill, while, on a close inspection, they present only a congeries of entering and returning angles exhibiting no plan whatever. It is in the interiors that the wealth of art is visible, though, in the churches, it is manifest on the exterior also. Thus, that of Aghia-Labra, founded in the fourth century, possesses a superb pair of doors, in hammered copper, eight hundred years old probably, and forming a singular resemblance to those of Ravello, near Amalfi. Within all is gilded; the altar itself is gilt—gilding covers the walls up to the roof, intermingled, however, with sombre paintings in encaustic; and gilding, again, makes gorgeous the pulpit, lecterns, and every other variety of ecclesiastical furniture upon which gold, in leaf or plate, can be laid. It is here that we begin to trace the transition from ancient art, which had Beauty for its ideal, to Christian art, which employed Form only as the expression of an idea. The Byzantine artists, viewing this, in a sense, as their mission, possessed many advantages for carrying it out; but, with the exception of a few mosaics in Italy, their genuine work is not to be found in its perfection anywhere except in the monasteries of Mount Athos. Two centuries before Constantine they had advanced their labours so far as to create a theory, and the principles of this theory are still extant in a manuscript, of which every convent possesses a copy, compiled by Fourna d'Agrapha, and which explains the secret of that monotony and immutability so characteristic in every age of Byzantine art, and, in fact, so traditional that the production of one painter frequently can scarcely be distinguished from that of his predecessor, who may have flourished three or four hundred years previously. But this stereotyping process was not confined to the monkish artists of Mount Athos: it pervaded the art of the Greek Church from the Lower Empire, in Russia, in Asia Minor, and even in the monasteries of Mount Sinai. Perhaps nowhere in the world is there a more pure example than in the edifice now spoken of—a colossal Christ occupying, with attributes, the entire dome. It is a study in itself. The flesh is straw-coloured. One hand holds the Gospels—the other is pressed over the heart. The hair is flaxen, while the beard is black, as are the eyebrows, the other figures in the group being lessened in stature in proportion as their historical importance diminishes. The Archangels are represented as wearing dalmatics of gold embroidery, and bearing sceptres surmounted by the sacred effigy. All is brilliantly coloured, except the ground, which is dark and dead as charcoal. But the sky, whence bodiless cherubim are descending, is of lustreless gold, and showers of golden stars burst around the head of the Lord, whose eye, from whatever point the monkish worshipper may look, is fixed upon him. Near at hand are the Four Evangelists writing at the dictation of an Apostle; a cross, painted with bright figures on a black ground—a strange peculiarity in itself—and a picture illustrating an episode of the Crusades. This is a French King with a Merovingian crown, a dalmatic ornamented with the royal lilies, and a little church in his hand, which he is presenting, no doubt, to the good believers of Mount Athos. All around are carvings of anchorites in attitudes of prayer, such as to this day inhabit the grottoes of the mountain; old men reduced nearly to skeletons, wearing enormous beards, and only leaf cinctures as clothing, with the inscription daubed above them in thick gold leaf—"This was the life of the Lone Hermit." The majority of the paintings are in frescoe, and attributed to a single artist, the date of whose labours is unfixed, but who executed his work bit by bit, and joined it together so delicately that the lines of juncture, at a little distance, are invisible. Neither in his selection of tints, nor in his composition of groups, did he make the faintest attempt at reality. He drew outlines and threw on colour at the suggestion of the moment; but preferred frescoe, as then distinguished from encaustic, painting—two processes which, it is needless to say, have since undergone many changes and some confusions in the sight of artistic history. However, as all these works are absolutely dateless, they can only be approximately assigned a place in the "Calendar of Art" by comparing them with the chronology of some celebrated Italian examples. Thus, the mosaics of Santa Pudentiana at Rome belong, beyond all doubt, to the second century—and their Christ is a reflection of that in the parent church, as is supposed, of Mount Athos. Those of St. Paul's outside the City and of St. John Lateran, two centuries younger, are also ascribable to the epoch in which Byzantine art reached its apogee; while those of St. Como and St. Damiano on Mount Athos, and in the monasteries affiliated to it, exhibit the same deterioration; and in the ninth century the degradation is complete: there are only angles and straight lines in both mosaics and pictures. The parallel may be followed two hundred years later in Santa Vitale, at Ravenna, in Santa Maria, in Trastevere, and even in St. Sophia itself at Constantinople. The monks of Mount Athos were multiplying their unprogressive pupils throughout the civilised world, and the touch of their hand is perceptible even in the gold painting of St. Mark's at Venice. They still persevere with their self-appointed task, which is to convert the entire mountain into a series of picture galleries, all severely and uniformly in the original Byzantine style. Their method is, first, to clear the wall and obtain a smooth surface, then to lay on with a trowel a certain thickness of plaster; next to assign a place, and a height to the central figure, whose head, upon which a beam of light must be concentrated, is, as a matter of course, out of all proportion with the rest of the figure, as the rest of the figure is with the figures around. This done, the first artist gives over the task to a second, who lays down a foundation of red-brown paint, and to whom succeeds a third, who adds, exactly as his predecessors did hundreds of years ago, large contributions of red and blue preparatory to the crowning of the gigantic Christ with the *nimbus*, the outlines of which are traced by means of an apparatus resembling a pair of compasses, but of very primitive construction. The colours are laid thickly on, take a long time to dry, and have no sort of harmony one with another. The interest of the process, indeed, consists simply in its being evidently a reproduction, so utterly untouched by modern art-knowledge, of the processes by which were similarly decorated those cloisters, for centuries fallen into ruin, that were inhabited by the long-buried predecessors of these mechanical artists. And yet, amid all this monotony, a few glimpses of genius enlighten the general vacuity, as in the chief church of Iviron, where the encaustic paintings in the choir are of rare beauty, though it is impossible to attribute them to any particular, or even to the same, epoch, and where the doors are of exquisite wood-work, encrusted with mother-of-pearl, with twisted columns of the true Byzantine order, and exterior walls of reddish brown. But, however crude the condition of art, as illustrated in the monasteries of Mount Athos, may be, it is, on that account, all the more historically interesting as indicating a time when, the antique arts being destroyed, a new system of ideas endeavoured, by the humblest efforts, to replace it, and ceased to grow almost from the moment when it was born. The Byzantine school, in fact, was something saved from the wreck of the ancient arts, and clumsily, though characteristically, adapted to new purposes some new elements and materials mingling with the old. Though, as we have seen, not marked by much development, it had, nevertheless, its seasons of growth and decay. Perhaps the close of the third century may be said to have witnessed its perfection, and that of the seventh century its downfall. By the Emperors of Constantinople it was, in the first year of their glory, greatly encouraged; but their patronage fell off when it was found that the Monks of Athos, instead of caring to gild heroic apotheoses for the lords of the Lower Empire, preferred to build their own churches, and paint altar-pieces for them, with saints, and martyrs, and bishops in aureoles and mitres, hardly less heavy with the precious metal—which their friends and families sent to them from Wallachia and Moldavia—than if they had been of solid gold, encrusted upon the painting. Their isolation and obscurity were of advantage to them in one respect. There were no Dark Ages on Mount Athos: it never emerged much into the light; but, on the other hand, it never sank entirely in the gloom; and thus, raw and rude though their art may have been, it is the single incontestable link between the two epochs. It was Christian Art, if not the Christian Art of which Italy, in after times, though still owing a debt to these mountain painters, witnessed so marvellous a growth, and, perhaps, for the sake of its characteristic qualities, we may not greatly regret the inflexible conservatism of its professors. They saw Cimabue corrected by Giotto, and took no notice of either. They cared, indeed, little for art in itself, except in the service of religion. And their art, like a cast taken in metal, stands immutably before us, as it did in the second, the fourth, the ninth, and the eleventh centuries. It

may, as a result, be no more than a relic to excite the admiration of the antiquarian artist, or the curiosity of the learned; yet it has its history, and its history has had a meaning. In the famous Bolognese Treatise we find revealed many of the arts which these inventive and adaptive Monks of the Mountains practised; and, notwithstanding the general crudity of their work, it is astonishing to note the number and variety of their tricks, as they may really be described, in producing effects which, be it remembered, they at first produced only for themselves, and not for pilgrims, whose donations might swell the total of the monastic money-box. It is curious to read, in the records of these time-worn establishments, keeping out of the general world as they did, how the Byzantine brethren sought to preserve their secrets intact, and especially their use of gold in pictures. The early Italian frescoes, as they are called, were, it is well known, adorned with gold leaf; the same decoration, indeed, was extended to miniatures, and, subsequently, even to paintings in oil; and, indeed, this use of the precious metal, invented on Mount Athos, became universal until Domenico Ghirlandaio discovered a method of imitating gold in colours. The monks, however, went on their way; they could discriminate between the damp and the dry walls on which their pictures were to be hung; they tried a thousand experiments, all preserved among themselves as "mysteries," and a *nimbus* has been found, in a chapel decorated by a gift from the brethren of the Macedonian hill, in which a thick incrustation of gold-dust was deposited upon a layer of Italian wax. Seven thousand leaves were used, on the Byzantine principle, in "painting" the chapel of St. Jacopo of Pistoia, and the Eastern method became so costly, as applied to pictures, that, in later days, an adulteration of quicksilver, tin, and sulphur was detected in the *nimbi* of the Virgin at Bologna. The Athos artists, too, had their secrets in other directions, which they varied, while, as we have said, never diverging from, so to call it, the original pattern and inspiration of their art. They made use, in painting, of wax and caustic potash, always, however, calling in the aid of gold to crown the Madonna or the Christ, or to make a halo shine around the head of the Saint; and one of their exploded methods is still practised, to a modified extent, in the studios of Parma. With them, again, originated some other inventions, which have made their way and their renown in the world. Niello, the damascening of Milanese armour; the rose and purple dyes applied to wool; painting in oil on wood; the mineral blue used by Titian; the "Hebrew white" employed by his predecessors and rivals; and, following the tradition, Corregio's mantle of St. Jerome, in which "the blue drapery was the thickness of a five franc piece above the rest of the picture"—all these lessons have come down to us from the really pre-Raffelle Monks of the Macedonian hill, whom the Treaty of Berlin has permitted to continue at peace, in their charities and their labours—the latter being chiefly remarkable, as we have already suggested, because by them was originated Byzantine art, whatever its worth, while, by them, Byzantine art has been so far preserved that we know precisely what it was at the beginning.

CONCRETE SLAB COTTAGES AND OTHER BUILDINGS.

MR. W. H. LASCELLES, of Bunhill-row, Finsbury, as our readers may know, is the patentee of a species of concrete slab before referred to in these pages. He has erected several blocks of cottages with the material at Croydon, and we believe the earliest of them, built in 1875, has stood well, and has always been let to respectable tenants. But the enterprise of Mr. Lascelles has not stopped here. He has wisely endeavoured to show that the slab system of building can be employed in an artistic manner, and that it admits of as much picturesqueness and effect as the older materials at our command. Under the title of "Sketches for Cottages and other Buildings," Mr. Lascelles has published a series of designs by Mr. R. Norman Shaw, R.A., showing the application of the patent cement slab system. These have been well drawn by Mr. Maurice B. Adams, A.R.I.B.A., and comprise about thirty plates of subjects, each being illustrated by a perspective sketch, a ground and chamber plans. They form an architectural work of illustrations from sketches by one of our most popular architects—an acknowledged master of the later domestic English styles—though in some of them we can scarcely trace the authorship. The subjects comprise chiefly workmen's and middle-class cottages, single and in groups, game-keepers' and entrance lodges, bungalows, small villa residences, besides a workmen's hall, and sketches for a cottage hospital, almshouses, chapel school, and a small mission church. The cottages range from the one-story "But and Ben" of the north to the two-story single or double cottage, and are well suited for erection in rural localities, suburban and agricultural districts, or where the services of the skilled bricklayer and plasterer are not readily obtained. For the growing requirements of manufacturing towns, for agricultural districts, and especially for exportation to our colonies, we can scarcely conceive a more appropriate kind of building—so light, so easily transported, and so thoroughly impervious to the weather. Walls are erected upon a similar plan to those tile-hung. Uprights of 3 to 4in. square, about 3ft. apart, tenoned to a sill-piece resting on a bed of concrete, form the framework. Upon these studs or uprights the concrete slabs are screwed. These are about 3ft. by 2ft., 1½in. thick, and the face side, placed outwards, can be "rough cast," or cast to resemble wall tiles, and the inside papered or painted. One of the advantages of the system is the facility of execution afforded; the bricklayer and plasterer are not required; a carpenter has only to be instructed in framing the studwork, and the patentee guarantees to instruct beginners by sending a foreman and charging merely his time at 1s. per hour, besides expenses. Opening the book before us, we pick out at random a few instances in which the artist has indicated how the material may be applied. The first is a "But and Ben," or a workman's cottage—which we illustrate—after the Scotch model, consisting of a "but" or living room about 14ft. by 11ft., with a box or bed recess screened by a curtain, a larder, a "ben," or back room, with bed recess, and a porch; scullery, coal, ashes, &c., under a lean-to roof. The whole is very simply treated under one span, the lean-to and gable end being relieved by framed timber. The design has been erected for the Paris Exhibition. A similar treatment is given of a double cottage, in which recesses at the side of rooms are provided for a chest, and two recesses for beds. For these single-story dwellings the material seems admirably adapted, and the plans given are generally compact and economical. Designs for cottages of two stories are shown—these generally partake of the ordinary features of half-timbered houses with oversailing tile-hung upper stories; indeed, there is little that is special to the material about them, though they all bear evidence of artistic grouping of parts. We notice particularly a double "But and Ben Cottage," with lean-to for scullery and out-offices, and bed recesses; a pair of workmen's cottages; a group of three cottages, with two bedrooms each, in which the lower story is of timber filling-in with slab-hung upper story; a group of four cottages having three bedrooms each; a block of five cottages of two bedrooms; and a row of four-roomed cottages suitable for a village. We think the group of five cottages and the row are more successful examples of the concrete slab system than those in which much half-timbering has been shown. The arrangements of some of these are clever as regards the entrances. "A Pair of Workmen's Cottages," semi-detached, is very picturesque and suitable; and the pair of cottages for a rural site, with the wide-panelled spaces of the lower story, lends itself well to the concrete construction. On another plate we have an entrance lodge, simple in plan and appropriate, but, we presume, the lower story is of brickwork—at least, it is shown so. This design is on view at the Paris Exhibition. Coming to the designs for larger residences, we are inclined to think the author's treatment is less successful. Thus the design for a small detached villa residence, though admirable for brick, is scarcely characteristic of cement-slab construction; the "middle-class cottages" are better, and the treatment is suited (see our illustration). The fact, is we lose the motive for this kind of construction in large buildings, or in which more solid materials are necessary. There is no reason, however, why brick should not be combined with this cement slabwork, and a good example of this is shown in the "Workman's Village Hall." The designer and draughtsman have, in their effort to produce picturesque grouping and contrast of parts, ignored the material, and we look upon many of the designs as quite as suitable for brick and timber as for the patent slab. We note the "Shooting-box," the "Sea-side Bungalow" and designs for smoking-room and boat-house as some of the best in the collection viewed in their relation to the material. Thus the sea-side bungalow could be framed and filled in with slab, or the studwork could be formed as cement panelling. The plan of the latter has been arranged with particular regard to the prospect or view of the sea, the windows being so placed as to command views thereof. In the Boat House the whole superstructure is light, and rests upon posts, and its construction in a light material is well adapted to the slab system. Among other designs of merit we may mention a block of almshouses, a small stable and coachman's cottage, a cottage hospital, and a small mission church for 80 worshippers—the latter will be found among our illustrations, and may serve to indicate the capabilities of concrete and timber for structures of an unpretending class. We may say, indeed, that Mr. Lascelles' pleasing sketches are equally applicable to concrete construction of all kinds as well as to brick and timber. There is nothing about them to suggest what they really pretend to be—walls of slab; the window-frames are flush with the outside of the studwork—in fact, the studs actually answer the purpose of frames; and, in looking at some of the sketches, we may imagine we had before us some of the charming combinations of half-timbered work to be found in the counties of Shropshire and Sussex. We might consider this lack of individuality in the designs before us as a defect, but there is much in the common attributes of brickwork and timber that is appropriate to concrete building. We will not assert that the executed example will quite come up to the sketch; much is due to the artist, and we hope that the erection of designs of this class will be entrusted to

* Sketches for Cottages and Other Buildings to be constructed on the patent cement slab system of W. H. LASCELLES, from sketches by R. NORMAN SHAW, R.A.; drawn by MAURICE B. ADAMS, A.R.I.B.A.

an architect. In the grouping, roofs, and chimneys, a great deal may be done to economise, and the bungalow and one-span forms of roof shown in the earlier designs are well adapted for the purpose, and might become suggestive of new combinations. We are sorry that no descriptive text is given, and that nothing as regards cost has been hinted at; this is an omission that might be supplied. We should judge that some of the simpler designs shown might be executed, under favourable circumstances, for at least from 15 to 20 per cent. less than brickwork, as there are several points where expense could be saved. Thus, as regards the carpenter's work, just one-half the usual number of studs is saved, no bracing is required, intelligent labourers might be taught to screw up the slabs on the walls and floors; the windows and doors can be fixed to the quartering, and, where a number of cottages are built together, the saving in carriage would be considerable as the slabs occupy less space than bricks, and six of Mr. Lascelles' walls are only equal to one brick wall. The "But and Ben" we illustrate could probably be built for £100 in this material, though, of course, circumstances and locality must be considered. Under the system of Mr. Lascelles the timber framework in the gables and sides can be cast in the slab form and placed *in situ*. We do not approve as thoroughly honest this imitation of woodwork—we should prefer the real timbering; but it is fair to observe that the system may be employed in a legitimate and artistic manner by relieving the wall faces and throwing them into panels or any kind of surface relief or decoration; and we should like to have seen a few designs showing such a mode of treatment. The slabs, as we have said, can be used in floors and roofs—in fact, everywhere; and the great peculiarity of the principle is that it simplifies construction and reduces the demand for skilled labour. We have, therefore, satisfaction in recommending it to the consideration of all landowners, speculators, and the profession generally, where economy is an object. In the book under review we have a series of artistic designs suitable for any material than specially applicable for the particular system intended, and we believe the book will do good service as the pioneer of a new and more artistic era of concrete building. We must add a word in praise of the excellent photo-lithographic reproductions printed by Mr. J. Akerman. The work is in quarto form, the perspective views and plans being drawn on a large and intelligible scale. The examples we illustrate are more or less reduced.

THE CHEMISTRY OF BUILDING MATERIALS.—VIII.

WOODS.

THE term *wood* may be said to include all substances containing woody fibre which are used in any way by the builder—as timbers, ropes, and cords made of flax or hemp, felt, &c.; but we shall at present confine our attention to the first-named material as employed by the carpenter or joiner. Timbers for building purposes are derived from two great classes of trees, one of which has the stem solid throughout, and supplies the carpenter with planks and balks of timber, and the joiner with thinner boards or battens. Trees belonging to this class are termed *Exogens* or *outward-growers*, the newest layers of wood being those furthest from the centre. The other class includes trees which have hollow stems, such as the bamboo, date palm, and other tropical plants, which are termed *Endogens* or *inward-growers*, and from their character can only be used in their entirety, and cannot be cut up into thin planks. It is chiefly to the Exogens that we must look for our supply of wood for building purposes, especially in cold or temperate regions, although in some tropical countries, where these trees do not grow, the Endogens supply a very serviceable material for building purposes.

If we cut across the stem of an exogenous tree we find that its softest part is on the outside, immediately under the bark, while the centre is generally very hard if the tree is in sound condition. The centre, or *heart wood*, is the oldest portion of the tree, and it is through this that the sap rises from the roots to the branches and leaves. The sap consists of fluids and gases absorbed from the soil by the roots, and drawn up through the cells which form the material of the tree. It is a compound of oxygen, hydrogen, carbon, nitrogen, sulphur, soda, lime, magnesia, iron, phosphorus, and water, with other elements often in minute proportions. The water is the chief ingredient, forming, as it does, about 90 per cent. of the whole. The nitrogen found in wood is obtained from the soil, and is essential to the growth of the tree, while the carbon is chiefly absorbed by the leaves from the atmosphere.

The sap having passed through the inner wood of the tree, from the root to the leaves, becomes completely changed in character and composition by giving off oxygen from the leaves and absorbing carbon from the air through the same means. With the carbon thus obtained the sap descends by the outer portion of the branches and stem which immediately underlies the bark, depositing a new layer of woody fibre on the outside of that of the previous year, so that the tree is increased in diameter while the inner wood is pressed more tightly together, and becomes harder and harder every season. By cutting across the stem of a tree the wood can be seen in distinct layers, each of which indicates a single year's growth; the inner part being generally darker in colour, as well as harder and more compact, than the outer. The bark serves as a protection to the newly-formed wood, the outer portion of the bark splitting up and dropping off each year, to allow of the enlargement of the circumference, while the inner bark takes its place. The amount of *sapwood*, or new deposit, which is found in full-grown trees, differs very materially, according to their characters, the fir having more than the oak, and the oak more than the chesnut; the proportions being nearly as the numbers 4, 3, and 1.

If we examine with the microscope a very thin slice cut from a piece of wood, we find that it consists of a number of fibres united together, and that these are made up of minute cells or *cellular tissue*, encrusted with layers of woody matter, which fills them up, and renders the material hard and solid. The tissue of the cells consists of a material known to chemists by the name of *Cellulin*, while the incrusting substance with which they are more or less filled is termed *Lignin*. *Cellulin* forms the basis of the tissue of all plants, and when pure, as in cotton, linen, elder pith, &c., contains only the three elements carbon, hydrogen, and oxygen, in certain fixed proportions; is tasteless and insoluble in water, alcohol, ether, or oils. It has a higher specific gravity than water, and can be dissolved by strong sulphuric acid, weak acids having very little effect upon it, although more upon newly-formed wood than on the older. Dilute alkalies do not act upon cellulin, but when concentrated they gradually destroy its texture.

Lignin or woody fibre, which is always found incrusting the cells of trees, and gives hardness to the wood, has a different composition to cellulin, and varies considerably in different kinds of wood. It is found to exist in greatest abundance in the heart-wood of trees, and the harder the wood the greater the quantity of lignum; it is insoluble in water, but easily dissolved by alkalis; water saturated with chlorine gas will also readily dissolve it, while sulphuric acid chars it. Lignin is generally found mixed with some resinous matters which give colour and inflammability to the wood. Saline matters are also found in the woody fibre, as well as small quantities of nitrogen.

Albumen is a substance found in greater or less quantities in nearly all plants, but especially in the soft sapwood which has been recently formed on the outer portion of growing trees. This material closely resembles in its chemical composition and other properties the animal albumen obtained in a nearly pure state from white of egg. It is a compound of carbon, hydrogen, nitrogen, and oxygen, with small proportions of sulphur and phosphorus, being from the nature of its composition more liable to decomposition than any other part of the tree. If heated to 150° Fah. it becomes coagulated, and is then quite insoluble in water, but is readily dissolved by alkalis. It forms an insoluble compound with the poisonous substance known as *corrosive sublimate* (chloride of mercury), which, when combined with albumen, prevents its decomposition.

Water forms an important constituent in all kinds of wood, in which it exists partly in chemical union with the other elements—carbon and nitrogen—and partly in what is termed the *hygroscopic* form, or capable of being removed by the simple process of evaporation or drying. More water is generally found in soft than in hard wood, beech containing about 19 per cent.; oak, 35 per cent.; white fir, 37 per cent.; and red fir, 45 per cent. of water. When wood is heated to 130° Fah., the hygroscopic water is driven off, and the wood is then said to be dried.

Carbon is the chief constituent of wood, from which it can be obtained in a nearly pure state by heating to redness in a closed vessel, so as to drive off the other elements. The proportion in different wood varies considerably, oak containing 50 per cent., and beech about 40 per cent. of this element.

Turpentine is a kind of gum which exudes from many of the pines and firs when in a growing state, especially if incisions are made in the stem; and when subjected to the process of distillation the hydrocarbon called *oil of turpentine* is obtained, which is much used in the mixing of painters' colours, and, being composed of carbon and hydrogen only, it is a highly inflammable material. The solid residue after distillation of crude turpentine is the gum termed *resin*, which is much used by plumbers in soldering. The exudation of turpentine will continue in some pine wood long after it has been cut down, especially when exposed to heat. Such woods are also difficult to work with the tool on account of the toughness and resistance which the resin imparts, and consequently are not well adapted to the finer work of the joiner, although highly valuable for the rougher purposes of the carpenter, since those woods which contain much turpentine are generally strong and durable, this substance being but slightly soluble in water, and as it contains no nitrogen is not decomposed by the action of air or water. Oil of turpentine is a great solvent of gums and resins, with which it combines to make varnishes; and as it also unites freely with fixed oils it is a valuable ingredient in the mixing of oil paints.

Tannin or *tannic acid* is an astringent principle found in several trees, but more especially in the oak. It has the property of forming an insoluble compound with *albumen*, which enables it to prevent putrefaction taking place in the wood. The durability of oak when employed as a

building material may be considered to depend in a considerable degree on the proportion of tannic acid which it contains; but, as it is very soluble in water, oak wood should not be seasoned by soaking for any considerable time in water, which might dissolve out a portion of this substance, and render it more liable to decay.

If a solution of a salt of iron, as the sulphate, is poured on wood containing tannic acid it will turn to a bluish-black. Rusty iron nails when inserted in oak will also have the effect of blackening the wood.

Decay is a process which commences in timber with the decomposition of the albuminous substances, in which a fermentation is set up, owing to the presence of nitrogen, of which element albumen contains 16 per cent. The decay of the wood takes place by its absorbing oxygen from the air and exhaling carbonic acid and water, so that the solid part crumbles down into a soft brown vegetable mould or *humus*, which contains a larger proportion of carbon than is found in the undecayed wood. Since the sapwood of a tree contains more albumen than any other part, it is in this that the decay usually begins, as, by being more spongy and less dense than the older wood, it admits air more freely, and so facilitates the progress of the fermentation. The albumen by its decomposition also affords a fertile soil for the growth of fungi, the spores of which are always floating about unseen in the air, and when deposited in a favourable soil will grow with wonderful rapidity, living upon the juices of the wood, and by absorbing all its moisture leaving it in a dry and powdery condition. In order, therefore, to prevent decay it is necessary that as much of the sap and water should be got rid of as possible, which may be done by soaking for a few days in water, and then allowing it to dry thoroughly in the air, or by applying a moderate degree of artificial heat. Coating wood with an impervious substance, such as tar or paint, prevents to some extent the action of the air in producing decomposition; but the most effectual method of preserving wood is to steep it in a material called *kreasote* obtained from coal or wood tar. It is to this material that wood-smoke owes its pungent odour and antiseptic properties, and when mixed with albumen it causes its immediate coagulation, so that it is the most powerful of antiseptics. The process termed *kyanizing* is saturating the wood with a dilute solution of *corrosive sublimate* (chloride of mercury), which, by forming an insoluble compound with the albumen, prevents to a great extent its decomposition.

OUR COMMONPLACE COLUMN.

CARRARA MARBLE.

CARRARA MARBLE, so named from a town in Northern Italy, where it is quarried, is a fine white saccharine limestone. It is an oolite much altered by plutonic action, and its purity and texture have made it a valuable material to the sculptor. There are upwards of thirty quarries in Carrara, but only a few furnish the statuary marble under this name. This marble is not suited for external uses. We may mention the decay of the group of Queen Anne in front of St. Paul's, erected at the commencement of the last century, and the statue of King George III., which also had to be removed owing to its decomposed surface. Several other instances of the perishable nature of Carrara marble may be cited. The "Sicilian" or the Ravaccione marble has supplanted it for out-of-door uses.

CARYATIDES.

A term derived from *Caryatis*, literally a woman of Caryæ, and applied to female figures used as columns. Many hypotheses of the origin of the name has been given, the principal one being that the Greek artists employed the female Caryatæ in their national costume to commemorate the disgrace of the defeat of the Persians, the inhabitants of Caryæ having joined the latter after the battle of Thermopylæ. The male prisoners were slain, and representations of them had been made by the Greek sculptors under the name "Persians," and were employed as columns; and figures representing the women in captivity were afterwards used for a like purpose. Another and more probable explanation of the term is that at Caryæ there was a temple to the goddess, Diana Caryatis, and that at her temple and statue the Lacedemonian virgins celebrated an anniversary festival. It may be concluded, therefore, that the statues called "Caryatides" were used about the temples of this goddess, and that they were really representations of the virgins engaged in her worship. In the Pandroscum representations of virgins are seen; these were probably Canephoræ, who assisted in the Panathenaic procession. The best examples are those used at the temple of Erechtheus at Athens, and copied in the church of St. Pancras in the Euston-road. In this instance it will be noticed the figures in the return sides face in the same direction as those under the front entablature, and not sideways.

"C. L. B." writes:—"Gwilt leaving the question open from whence the Greeks gained the idea of placing figures to support an entablature, gives us another and perhaps more probable story in support of the origin of the name. He considers the female figures to represent virgins engaged in the worship of Artemis. There are various accounts explaining why the name of the goddess is linked with that of the town. One is simply that Artemis was worshipped there, and the town possessed a temple of that goddess. Another claims an origin quite distinct from the Laconian city; it is this:—Some virgins threatened with danger while celebrating the rites of the goddess, took refuge beneath a nut-tree (*καρυα*), and in memory of their deliverance raised a temple to Artemis Caryatis. His theory seems more probable than that of Vitruvius, and is supported by various authors ('Gwilt,' p. 70). When or how the statues themselves first came to be used in this way by the Greeks we cannot determine. We know they were used in Egypt and India long before any reliable history of Greece begins. The idea may have been brought from Egypt by the Persians, and so have been taken by the Ionic and other colonies then under the Persian sway, and thus the new fashion would spread through the Athenian empire and the whole of Greece; this view would also account for, in some degree, the name of Persians given to the male figures. Atlantes and Telamones are but other names signifying anything that supports a weight or burden. The best known examples in Greece are those in the Erectheum at Athens. The temple of Zeus, at Acragos, also shows them. They were copied also in many Roman buildings."

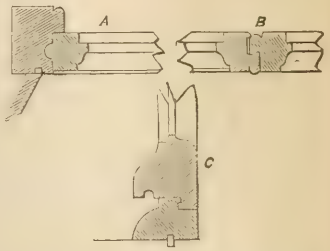
"J. A." sends the following:—"Caryatides are female figures employed in architecture in place of columns. Vitruvius attributes the origin of Caryatid figures to the circumstance of the inhabitants of Caryæ, a city of Peloponnesus, taking part with the Persians during the invasion of Xerxes, and their consequent punishment. The men were slain, the women carried into captivity, and their ignominy was perpetuated by the employment of figures, similar to the women of Caryæ, in place of columns. The use of these figures appears to be more ancient than the date of the above story. Like many other forms of art, they were most probably drawn from Egypt. Six beautiful Caryatid figures were employed in the Pandrosion—one of the buildings on the Acropolis of Athens. These were on the southern portico—four in front and one on each flank. (The northern portico had six Ionic columns placed as the Caryatid figures—viz., four in front and one on each flank.) The Caryatid figures were placed on a basement and supported an enriched entablature. One of the figures is now in the British Museum among the Elgin collection. The execution of this figure is very fine, its height is 7ft. 9in."

CASE HARDENING.

The process of imparting a steel surface to iron goods. See Dr. Ure's "Dictionary," Clarke's "Manual," &c.

CASEMENT.

A hinged frame, generally glazed, fitted to window openings. The point of most importance in the construction of a casement window is the close-fitting and weather-tight qualities of the bottom rail and meeting stiles. Unless great care is taken to insure accuracy of fitting in the rebates no ordinary casement is safe against driving rain. Casements are generally hung to solid wrought frames with oak-sunk weathered and throated sills, and vary from 1½in. to 2½in. in thickness. The casements may be of deal, wainscot Honduras or Spanish mahogany, and in the specifications it is usual to describe their thickness, whether moulded, ovolo, or astragal and hollow; if with margin lights, transoms; their hanging, which is usually with 4in. iron or brass butts; the mode of fastening, whether by any patent, or with espagnolette bolts; if with weather bars, &c. *Joints:* For ordinary casements the sill should be well throated, the hanging stiles should be grooved, and corresponding beads should be let into the casement frame. Besides these precautions the meeting stiles should interlock into each other—that is, the rebate should be formed with a hook joint, so that the rain should be checked in its direct progress through the joint. Outward-opening casements are the best to insure imperviousness to the wet. Sometimes a fillet is fixed to one of the stiles to prevent the ingress of wet, and a weather-board is fixed to the bottom rail to throw off the wet. One or two modes of forming the meeting stiles and



sill we give in the margin, A and B being a section of the frame and stiles, and Fig. C the bottom rail, fitting into a rebate with grooved nosing over the sill. Sometimes the meeting stiles are made to fit as a hinged joint, and the leaves are then closed together. *Fastenings:* An espagnolette bolt is necessary for large inward-opening casements, or a shifting plate running from top to bottom of casements, and made to fit into a groove in each stile by the handle in closing. A water bar for the bottom rail is also necessary. The French are ingenious in their casements, and by adopting the round and hollow or hinge joint, the two leaves, when closed, press against each other and into the frames, thus tightening the joints. For examples of casements we refer our readers to various details that have appeared from time to time in the BUILDING NEWS, and to our "Intercommunication" columns, where numerous hints have been given.

CASTLE.

From the Latin *Castellum*. The principal parts of a castle comprise the *fosse* or ditch, with its bridges, which encompassed the buildings; the *valla* or embankments upon which the walls rise; the barbican, which was an outwork of the castle, and usually a strong wall or raised mound or tower; the gatehouse flanked by towers and crowned by machicolations, through which heavy materials were dropped on the assailants; the "outer *ballium*" or "bailey," an area within the castle separated from the "inner ballium," and where the stables and offices were placed, and the inner ballium used by the owner or governor. There was a "donjon" or keep tower placed within or at one corner of the inner ballium, which formed a conspicuous feature, and contained the hall and state apartments. The chief castles in England are the Tower of London, Windsor, Dover, and Norwich. Of the square or oblong class we may name the Tower, Canterbury, Porchester, Rochester, Colchester, Dover, Norwich, Ludlow, Oxford,

Richmond, and Corfe Castles. Of the round or polygonal class are Arundel, York, Conisburgh, Berkeley, Lincoln, Oxford, Windsor, and Durham. Gundulph, Bishop of Rochester, the builder of its castle, introduced many Norman features, though to the Romans we owe the plan, the battlements, machicolations, and open galleries. We refer the reader to the article "Architecture Militaire" in Viollet-le-Duc's "Dictionary," also to article "Bastide," in the same work for further particulars. The charming novelette by the same author, entitled, "The History of a Fortress," contains a very clear exposition of the parts of a castle. See our review of this work in the BUILDING NEWS, 1876, also articles on Caergwile, p. 200; Chirk, p. 223; Colchester, 454; Denbigh, 225; Goodrich, 149; Hurstmonceaux, 330; Kilpeck, 148; Ludlow, 139; Norman, 251; Nottingham, 194; Windsor, 245, in Vol. XXXIII.

"J. A." refers to Burgh Castle and Richborough as Roman castles. The latter, "J. A." says, is, perhaps, the earliest Roman castle constructed in this island, and is supposed to have been formed in the reign of Claudius, and completed by Severus. Layers of Roman tile or brick are found among the rubble walling. Rochester is also referred to as a fine example of a Norman castle. We may remark that much controversy has taken place respecting the Roman or Norman origin of Colchester Castle, and we refer our readers to Mr. Buckler's little work on the subject reviewed in these pages. See BUILDING NEWS, p. 454, Vol. XXXIII.

CATACOMBS.

"J. A." sends the following notes :—"Catacombs are subterraneous excavations, used as vaults for the burial of the dead. They are found in most parts of the world, but chiefly in those countries like Italy, Sicily, and Egypt, where there are extensive beds of soft tufa, or of some other stone, which is easily cut, and which is adhesive enough not to fall in. The catacombs of Rome are very extensive, and have been used as burying places and places of worship. Christian altars, inscriptions, and paintings have been found, and still remain in these gloomy crypts; but the long galleries of these catacombs, which twist and turn in a curious manner, are generally speaking about 8ft. high and 5ft. wide; there are mostly three tiers of graves or cells running lengthways, one above another along the galleries, and in some instances there are two, and even three, of these dark galleries beneath one another. According to the guides, the galleries run for 20 miles under the ground. Recent explorers state their length to be 6 miles. The catacombs of Naples are cut in tufo under the hill called Capo di Monte, and do not differ much from those of Rome."

CATENARY.

From Latin *Catena*, a chain. This is the mechanical curve formed by a heavy chain of uniform density hanging freely from its extremities. It has been considered the correct curve for an equilibrated arch, and there is no doubt that the form is admirably suited for an arch sustaining a great weight at the crown. Bernouilli, Galileo, Huygens, and Leibnitz have investigated its properties. A method of drawing it geometrically is described in "Gwilt's Encyclopædia;" see also "Tarn's Geometry." A flexible series of rods or rafters, suspended by its extremities, and supporting weights at the angles, will form a polygon of forces in equilibrium, which, if inverted, will give the correct form of a polygonal roof in equilibrio. If tangents be drawn to the extremities of a catenarian curve meeting at a point, they will represent the directions of the forces sustaining the curve at those points, and they will intersect at a point in a vertical line passing through the centre of gravity of the curve. Upon this last line we may represent the weight of the curve, and complete the parallelogram; then the respective sides will represent the direction, and force or tension, at the points of suspension. The Catenary curve has been found to be contained in the sections of Gothic vaulted buildings, and it insures pleasing proportion and stability.

CATHEDRAL.

We cannot here be supposed—and it would be unnecessary—to write an article on cathedrals, and we refer the general reader to Britton's "Cathedrals of England," the works of Professor Willis, Billings, Mackenzie Walcott, and the excellent handbooks on the English cathedrals published by Murray. The BUILDING NEWS and the archæological journals must be referred to for particular articles upon them—their archæology, architectural details, &c. Gwilt gives a complete list of the English cathedrals, with their founders and dimensions. The following list may be of use :—

	Date.	Classification, &c.	Dimensions.
Canterbury ...	1070—1492	Benedictine, begun by Lanfranc, and finished by T. Goldstone 11th prior	514ft. internal length, 148ft. 6in. breadth
Carlisle	1092—1419	Augustinian Canons	205ft. by 131ft. 6in.
Chichester ...	1091—1567	Secular Canons	380ft. by 129ft.
Chester	1128—1537	Benedictine	
Durham	1093—1480	Benedictine	420ft. by 172ft.
Ely	1082—1337	Do.	517ft. by 178ft. 6in.
Exeter	1107—1369	Do.	378ft. 6in. by 130ft.
Gloucester ...	1088—1450	Do.	400ft. by 141ft.
Hereford	1079—1502	Secular Canons	325ft. by 109ft. at small transepts
Lichfield	1200—1325	Do.	371ft. by 149ft.
Lincoln	1123—1450	—	482ft. by 222ft. at west tr.
Norwich	1096—1472	Benedictine	401ft. by 180ft.
Oxford	1150—1528	Priory Ch. of Augustinian Canons	154ft. by 102ft.
Peterborough.	1118—1528	Benedictine	426ft. by 186ft.
Rochester	1077—1400	Do.	313ft. 6in. by 122ft. 3in.
Salisbury	1217—1375	Secular Canons	450ft. by 206ft.
Wells	1206—1424	—	383ft. by 135ft.
Winchester ...	1098—1528	Benedictine	525ft. by 208ft.
Worcester......	1801—1395	Do.	388ft. by 128ft.
York	1215—1457	Secular Canons	486ft. by 223ft.

Collegiate churches are distinguished by having a college or chapter, consisting of a dean and canons, attached; though the service is the same as in cathedrals. Westminster, Windsor, and Southwell are collegiate. For an exhaustive sketch of French cathedrals we refer the reader to Viollet-le-Duc's Dictionary, article "Cathédrale," where plans and sections of Notre Dame de Paris, Bourges, Noyon, Laon, Rheims, Chartres, Soissons, Amiens, Beauvais, Tours, Sens, Poitiers, Narbonne, and other cathedrals will be found; and this is probably the most thorough treatise on the subject that has been written. We refer the reader also to Mr. Mackenzie Walcott's excellent articles in the BUILDING NEWS upon conventual arrangements—also to the *Encyclopædia Britannica*.

"J. A." contributes the following :—"Cathedral (from a Greek word, signifying 'a seat,' from the throne or seat of the bishop being placed therein). Almost every cathedral is varied in plan, although the leading features—the nave and choir—are found in almost all. The plan usually consists of a galilee or chapel, at the principal entrance; the nave, or main body of the church; the side aisles, which do not rise so high as the nave, somtimes with chapels, the choir, and the transepts. Some cathedrals have a double transept, and the transepts have often aisles. At the end of the choir is the high altar, behind which is occasionally a Lady chapel. Along the sides of the choir are ranged richly-carved seats; the bishop's seat richer than the others, and raised above them, is on one side, at the south-eastern end. Cloisters and a chapter-house are usually attached to English cathedrals. The largest cathedrals in Europe will contain about the following number of persons :—St. Peter's, Rome, 54,000; Cathedral at Milan, 37,000; St. Paul's, London, 25,000; St. Sophia, Constantinople, 23,000; Nôtre Dame de Paris, 21,000; Cathedral of Pisa, 13,000; and St. Mark's, Venice, 7,000."

THE BUILDING MATERIALS OF WALLACHIA AND MOLDAVIA.

THE united Principalities occupy a space of rather more than 12,000,000 hectares (about 30,000,000 acres), Wallachia taking up about three-fifths of the area, of which area it is estimated that 2,000,000 hectares consist of forest lands, valued at 190,000,000f. It is to be regretted that these fine forests, which spread over about one-sixth of the Principalities, and contain a great variety of building timber, cannot be utilised to any appreciable extent, owing to the difficulties of transport in regions yet untapped by roads. They lie chiefly in the districts forming the spurs of the Carpathians, and abound in fine timber of every sort—pine, larch, fir, oak, beech, ash, elm, lime, birch, maple, and wild cherry tree. The quality of the wood, well seasoned by the changes of temperature, is said to be excellent. But in these regions Nature is the only woodsman, and the mountain forests are, in a great measure, left to take care of themselves, while the districts bordering upon the plains have been ruthlessly and ignorantly disforested, regardless of the age or size of the timber, and this wholesale spoliation continues. Recently a tentative law was passed by which the forests of the State were subjected to control, and their cutting restricted and regulated according to the age and size of the timber, but the Chamber has not yet ventured to apply the law to private estates. Severe droughts and bad harvests, the natural results of such waste, are, however, attracting attention to the subject, and it is to be hoped that the evil may be arrested in time to prevent irreparable injury. The Principalities are said to contain a hidden hoard of mineral wealth in their soil, which is expected some day to become a principal source of their riches, but at present no efforts seem likely to be made to develop these resources. On the spurs of the Carpathians stones crop up—marl, sandstone, chalk, gypsum, &c., and near the tops of the mountains are found hard chalk, marbles, lignite, anthracite, schist and gneiss, fuller's earth, and lime, as well as paving and millstones, and an excellent slate stone for lithographic purposes exists in several districts; indications have also been found of copper, iron, lead, quicksilver, &c., besides gold and silver. Yet with all these temptations salt is the only mineral which has yet been seriously worked in the Principalities — viz., three mines in Moldavia and one in Wallachia. Petroleum abounds on the sides of the Carpathians, where the upper strata of the soil is so saturated with it in many places as to emit a strong odour of tar, and it is found almost at the surface-level, but as yet the inhabitants cannot prepare or refine it to compete successfully with the American petroleum. As might be expected of a people who are either too idle or incompetent to deal with such resources as are described above, the industries of the Principalities are almost too insignificant to be worth noticing. They consist of a candle manufactory at Galatz, where most indifferent candles are made; petroleum and colza oil manufactories, equally primitive; of some native cloth manufactories, for the most part closed; and, finally, some distilleries. Many years ago part of the tribute to the Porte had to be paid in timber, so that any difficulties which may exist in procuring it were overcome then, and might be now, if the will existed, but the management of the forests should not be entrusted to the natives, unless those undertaking it have first gone through a course of study in forestry in the schools of either Germany or France. There is building wood in abundance, both in Turkey proper, and the States which hitherto have been tributary to her: all that is wanted is knowledge to make the forests yield an annual supply, and energy to bring it to a market when felled, and these two qualifications seem wholly wanting.

COLCHESTER CASTLE.

WE recently alluded to Mr. Geo. Buckler's pamphlet answering objections made by Mr. J. H. Parker, C.B., and others respecting the theory the first-named gentleman has maintained for years, namely, the Roman origin of Colchester Castle. The question, like many others, will always remain a disputed point among archæologists—a *crux antiquorum* upon which a vast deal of learning and ingenuity will be spent. It will be remembered that at the meeting of the Royal Archæological Institute, held at Colchester in 1876, a full report of which appeared in the BUILDING NEWS, Mr. Parker maintained that Colchester Castle was Norman, and was built at the end of the 11th

century and further characterised as nonsense the idea of its being a Roman erection. Mr. Parker is thus at issue with Mr. Buckler upon a question few will undertake to express a decided opinion about from external evidence. "Where doctors differ who shall decide?" may well be said in reference to this point. Both the above gentlemen are competent to form an opinion. Mr. Parker has a world-wide reputation as an archæologist, and Mr. Buckler has devoted years to the Colchester remains. As we have, on two previous occasions (see BUILDING NEWS for 1876, and page 454, Vol. XXXIII.), noticed Mr. Buckler's work, it will be unnecessary to repeat the arguments, but we refer now to the subject again, having received a photograph of the north-east angle of the Castle, taken from a coloured drawing. In this drawing the masonry—one of the crucial points on which Mr. Buckler bases his theory—is clearly shown, besides many of the details, such as the inscription panels, the small window, and vent of the camera privata in the east wall, the fragments of Portland stone, a portion of a buttress on the north wall, believed to be of Norman construction by some, and the sloped basement, now stripped of its wrought-stone facing. The photograph before us gives an angular view of the castle or "keep," and shows the corner tower, also the room and brick turrets of recent erection; but the main feature of interest, and one which undoubtedly, in our opinion, lends countenance to Mr. Buckler's theory, is the regularity of the septaria and tile masonry and the Portland stone quoins of the lower part of the buttress, which Mr. Parker has contended is of Norman build. As to the mooted point, whether or not the masonry has been executed with the *débris* of older buildings of the Romans, we do not care to venture an opinion; but there is certainly evidence of greater regularity in the courses than we observe in the old walls of the town. There are other features, such as the window jambs and arches, that look more like original Roman than Norman work, but in face of the admitted resemblances between the two kinds of workmanship, we are not warranted in passing a decided opinion. We have seen Norman work composed of septaria and tiles; we have observed similar openings and jambs in other buildings of the same class, but the weight of conflicting evidence in the case of Colchester is certainly exceptional.

SHOW CASES AND SHOPS.

MOST of the productions of an ordinary shop-fitter are by no means models of art—indeed, shop fronts and their fittings have well-nigh become hopeless, as far as beauty is concerned, so that when an example occurs, evidencing plain suitability without vulgarity, it becomes the subject of thankfulness. Show-cases, too, are, as a rule, excessively ugly things, especially when they assume architectural airs, and are intended for the public exhibitions, such as that of Paris, where, at the present time, a really good show-case is an exception. Improvements in this, as in other furnishing matters, have certainly been made within these last few years, and many good suggestions have been adopted. We have another to offer, and we are indebted to an unknown shopkeeper in a small back street in Soho for the idea which, in skilful hands, might with ease be developed, in a simple way, to the material improvement of many a bare and ugly street front, without infringing, probably, the Building Act. In the instance referred to an ordinary ebonised shallow show-case, with rounded glass corners, is fixed outside each of the window openings on the first-floor, after the manner somewhat of projecting oriels or bays, but with so slight a projection as to come within that of the shop cornice below. The tradesman has thus secured additional space for showing his goods, while the frontage to his house compares favourably, on account of this simple expedient, with many a more pretentious example. Of course, the idea, like most good ones, will at once be capable of the most vulgar renderings, and again the goods of some trades, such as those of a tailor, are, in themselves, so irredeemably ugly, that the less show there is made of them the better. A simple treatment of wood framing painted white, with panes of glass not too large in size, might cheaply and easily be adopted. If this sort of thing, too, were employed in private houses for small ferneries, it would be an advantage. Of shop fronts themselves, we have now in London a few well suited to be more generally used if only shopkeepers would forego the vast sheets of plate-glass they now reckon of so much advantage. Mr. Norman Shaw has shown what can be done in a quiet way by the shop-front not long ago inserted for Mr. Marks in Oxford-street, and this has been copied in Piccadilly, near the end of St. James's-street. Mr. R. W. Edis has another example just finished, at the corner of Gracechurch-street, in Cornhill. The plan of the frontage presented an awkward problem, and this was in no way aided by the architecture of the superstructure, which is worse than commonplace. The architect has, however, managed to give a character to the shop, which we like, though the green paint used rather spoils the effect. White would have been much better, and no doubt the architect would, if he could, have had it so, judging from the shops he built last year at the corner of Brooke-street, W., as well as that now finishing higher up in New Bond-street. Mr. Collcutt has shown how plate-glass may be satisfactorily used by his building in St. Bride-street for Collinson and Lock, which, by the bye, has been singularly parodied not far off, in Farringdon-street, and this shows how easily a good thing may be spoiled. The front in Fleet-street, for the same firm as last-named, is, of course, also well known, if not so well liked. A rather early attempt at a better sort of shop-front is that by Mr. Horace Gundry, for a printer in Fetter-lane, E.C., one of the first examples of so-called Queen Anne in London. It is now having a top story added. Messrs. George and Vaughan did a rather good frontage, a few years since, in Piccadilly, but the shop-front there is by no means good. Mr. George, in conjunction with Mr. Peto, has been far more successful in South Audley-street. The block of shops in Oxford-street, by Mr. Wimperis has good points, if they are not equally original, and the last-named seems to have been thought of when the design was made. Fleet-street has just had some big shops added by Mr. Alex. Peebles, architect, in what is supposed to be Queen Anne. The design is spoilt chiefly by the stilted appearance obtained by carrying up the granite piers through the first floor or mezzanine. The manner in which the gates or open-ironwork shutters are hung deserves notice, and is a novel expedient. The circular-ended and projecting shop-fronts yet to be added to Clifford-chambers in Old Bond-street, by Mr. Thos. H. Watson, will be novel examples for London, and as a good specimen of shop-front that lower down the street, by Messrs. Salomons and Wornum, ought to be mentioned. The "glass shop" in the same street, by Mr. Thos. Harris, is curious.

THE ERECTION OF CLEOPATRA'S NEEDLE.

THE raising of Cleopatra's Needle into its final position on the Victoria Embankment is being carried on with energy by Mr. Dixon, and we may expect before long to see its erection an accomplished fact. Already it has been raised so high above high-water level as to be distinctly visible from Westminster-bridge, as well as from those of Waterloo and Charing-cross. The iron cylinder-ship in which the obelisk was brought from Alexandria was removed from its moorings near Lambeth Pier to a position immediately to the west of the Adelphi Steps at the close of May last, and at a suitable tide was tilted in such a position that the side of the monument most weathered will face the Thames. Before this was done the site on which it will stand was prepared by the Metropolitan Board of Works at Mr. Dixon's cost. A foundation was carried a depth of 40ft. in concrete, and the flanking blocks of granite at the angles of the stairs lowered. The iron casing having been removed, the gigantic monolith was gradually moved forward and upwards by means of seven 50 ton hydraulic jacks, and supported upon wooden wedges. It has now traversed half the platform, and rests in a nearly horizontal position on planking 10ft. or 12ft. above the stairs, and on the Westminster side of the pedestal. The apex points towards Waterloo-bridge, and the hieroglyphics on the upper part can be more closely inspected than will be possible at any future period. In order to secure greater stability for the obelisk a portion of the very rough and irregular base was removed during Thursday and Friday last. This operation has reduced the absolute height by about 5in., to a length of almost exactly 68ft. from the base to the slightly truncated pyramidion. The actual surface on which the weight will rest measures, on an average, 5ft. by slightly more than 4ft. 10in. = a superficies of 24·25 square feet. The material thus flaked off is seen to be a large-grained rather friable granite, having the quartz disposed in large crystals. The prevailing rich rose tint will effectively contrast with the low grey of the Embankment wall. It is a question whether, in view of the immense outlay incurred in transportation and erection, and the fact that so few obelisks remain perfect, it would not have been more judicious to have kept the monolith intact, supplying the necessary support by bronze crabs at the angles—a mode of treatment for which there are precedents in Rome. Returning to the process of erection, we may add that in a few days, when the obelisk has been lifted sufficiently high to clear the angle blocks of the stairs, it will be brought still more to the east and turned at right angles across the pedestal, which is built a few feet above the level of the stairs-platform. The centre of gravity will coincide with the middle of the platform. A strap of wrought iron will be based upon the centre of the stone, the "jacket" extending about 20ft., and from the strap will project strong trunnions, each about 4ft. long. These will each rest on a wrought-iron girder, which, in turns, will be supported by specially-designed timber scaffolding, disposed at the four main angles of a rectangular space, and in close proximity to the centre of gravity. As the girders are simultaneously lifted at each end by the hydraulic jacks, the stone will be raised and the pedestal, consisting of three steps and a plinth, will be built up in brickwork, set in Portland cement, and faced with granite masonry, and when the requisite height has been attained the obelisk will be swung round upon the trunnions and lowered into position as previously described. The work is being carried out by Mr. John Dixon, C.E., Mr. Double acting as manager. We trust no attempt will be made to repolish the stone; the rumoured re-cutting of the hieroglyphics "to make them more distinct," would be ridiculous, and it is to be hoped such a procedure has not been seriously contemplated.

THE DECORATION OF ST. PAUL'S CATHEDRAL.

THE report of the sub-committee on the decoration of the dome of St. Paul's has been published and adopted by the executive committee. The Dean and Chapter, on the 6th inst., sanctioned the preparation of cartoons for the experimental designs, but have reserved the power of rejecting them.

The scheme sanctioned by the report is practically that advocated by Mr. Oldfield in his pamphlet, "St. Peter's and St. Paul's," reviewed in the BUILDING NEWS, Dec. 22, 1876.

We regret that the committee have determined on the course adopted, believing, as we have before stated, that however advisable in itself the decoration of the cupola may be, it is not the first thing to be done. We hardly think that the Dean and Chapter will ultimately sanction the scheme, and it is not to be wished, in the interest of the completion of the cathedral, that any more projects should be put forward only to be abandoned.

The following extracts from the report, which is a lengthy one, will give a complete idea of the intentions of the sub-committee:—

The sub-committee appointed in June last by the resolution of the executive committee for the completion of St. Paul's, with instructions to make preliminary arrangements for the decoration of the dome in mosaic, now beg leave to report as follows:—

One of their first acts after appointment was to recommend to the dean and chapter the purchase from the executor of the late Alfred Stevens, for £100, of a model of one-half of the dome on the scale of about three-quarters of an inch to one foot, on the decora-

tion of which he was at work at the time of his decease. Though unfinished in consequence of his death, it appears to them to display a power and resource in architectural decoration which are perhaps without precedent in this country, and to contain more elements for the successful treatment of Wren's great dome than any other design that has yet been prepared; while they feel no doubt that the artists they propose to employ will be able to supply what is wanting in the model, and to give it that completeness and finish it might have attained had Mr. Stevens lived to complete his design.

Having secured this model as a basis for their operations, the sub-committee put themselves into communication with some of our leading artists, and finally selected Messrs. Leighton and Poynter, who, from their talents and the style of art they generally adopt, seemed to them those best qualified to complete and carry out the design they had adopted. Both these artists proved, fortunately, to be warm admirers of Mr. Stevens's design, and readily assented to assist in carrying out this scheme.

The sub-committee are, in consequence, happy to be able to report that they have made a provisional arrangement with Mr. Leigton to furnish cartoons for such subjects as may be determined upon to fill the eight great circles which are the most important features in Mr. Stevens's design. This he has agreed to do for the sum of £600 for each circle, or £4,800 altogether; which, considering the importance of the pictures and his position as an artist, the sub-committee regard as an extremely liberal offer on his part. Mr. Poynter has, with equal liberality, agreed to furnish cartoons for all the other figure subjects indicated on Mr. Stevens's designs at an aggregate cost of £11,480. From this, however, may be deducted the sum of £800 for a circle of cherubs sketched in the centre of Mr. Stevens's model, but which is omitted from the present estimate as belonging, not to the dome itself, but to the portion above, seen through the central opening, but not included in the present plans. Of the remainder, about one-half, or £5,300, are for the smaller circles in Mr. Stevens's design, together with the colossal figures on thrones, and other subjects on the plain spaces between the ribs, all of which must be varied in each compartment, and are charged at prices so moderate as hardly to admit of abatement. The other half, however, which is for the figure-subjects on the ribs, may be found capable of some reduction; as, for instance, by the omission of the three figures of men, or so-called Telamones, which support the base of each of the ribs. These, though much admired by some, are considered objectionable and inappropriate by others, and it may consequently be found expedient to substitute some more conventional architectural design—perhaps in combination with the Apocalyptic animals emblematic of the four Evangelists—at a considerably less cost than the £2,400 which is estimated for the cartoons of the Telamones. If they are omitted, it may possibly be found expedient to amit also the 16 smaller figures which in Mr. Stevens's design stand on each side of the base of the ribs. Some economy may also probably be exercised in repeating some of the minor objects with only such variation in colour or arrangement as may be intrusted to the mosaicists without the necessity for the preparation of new cartoons. As the expense of the cartoons for the 16 small figures is estimated at £1,200, it is anticipated that by these omissions and other small economies a saving of between £3,000 and £4,000 may be made on Mr. Poynter's estimate for the ribs. In the following calculations this possible economy is put down at £3,500, leaving his estimate practically a little in excess of £7,000, though this is of course subject to subsequent adjustment by agreement with the artist himself.

In addition to the arrangements with these two eminent artists, the sub-committee have entered into a provisional agreement for the execution of the more mechanical part of the design with Mr. Hugh Stannus, who long was a favourite pupil of the late Mr. Stevens, and is intimately familiar with his ideas and modes of execution. He was, in consequence, employed by her Majesty's Board of Works to complete the Wellington monument in St. Paul's Cathedral, which was left in a very unfinished state by his late master, but which has just been completed by Mr. Stannus with entire success.

The arrangement with Mr. Stannus is that he shall prepare, in conjunction with Mr. Poynter, and subject to the approval of the committee, a full-sized cartoon of two of the ribs of the dome and of all the architectural features between them. This cartoon, comprising one-sixth of the whole circumference of the dome, is to be coloured and gilt in imitation of real mosaic, and so mounted on canvas that it can be fixed up in the dome and its effect judged of almost as well as if it were really executed in tesseræ. Spaces will be left for the designs of Messrs. Leighton and Poynter, which, when translated into forms imitating mosaic, will be affixed in like manner to the dome, in order that their effect may be seen. The two ribs which it is proposed shall be executed by Mr. Stannus are intended to be different in design; one following literally that of Mr. Stevens's model, or with modifications suggested by the sub-committee, and for which Mr. Poynter is now occupied in preparing the necessary designs; the other, as suggested above, of a more conventional or architectural form. By this experiment not only will the executive committee and the public be able to judge of the effect, but a means will be afforded of modifying the design before anything of a permanent character is attempted.

The estimate for the portion of the work assigned to Mr. Stannus is £1,000, and this expense will not require to be repeated in carrying the work round the remaining five-sixths of the dome, as the architectural parts will be the same throughout, and will not require to be varied.

The sub-committee observe that the extreme darkness of the dome itself will render it difficult to distinguish clearly any decorations with which it may be adorned.

The introduction of gold grounds and bright colours to the extent contemplated in Mr. Stevens's design will, no doubt, go far to remedy this defect, though they will hardly suffice to remove it altogether. The sub-committee have, in consequence, had estimates prepared for the introduction of metallic reflectors to be placed within the external peristyle of the dome, in positions where they cannot be seen either externally or internally, but in a manner calculated by Mr. Penrose to double the amount of light at present introduced through the windows. The expense of these reflectors opposite the 24 windows of the dome, they are informed, will amount to about £400.

The expense of scaffolding is estimated at from £1,000 to £1,200. This estimate is based on the experience gained in the erection of that employed when Mr. Paris repainted Sir James Thornhill's pictures on the dome.

The great expense of the whole scheme is practically the actual execution of the design in mosaic. For this the sub-committee have obtained two estimates, from firms whose competence to undertake the work they see no reason for doubting: one from the Murano Glass Company, late Salviati and Co., at 40s. per foot superficial—the work to be completed in eight years; the other from the Messrs. Powell, of Whitefriars, who state their willingness to complete it in four or five years at from 30s. to 35s. per foot, according to the greater or less amount of detail that may be found in the cartoons, when finally determined upon. In addition to the reduction in price and saving of time, it need hardly be pointed out how great an advantage it would be if the works were undertaken by an English firm located in the immediate vicinity of the Cathedral. The ready communication between all the parties concerned, and their constant supervision, would facilitate the work in many respects, and probably insure its execution more satisfactorily than could be expected from any Continental firm whose works were distant from England. Another great advantage that may be expected from the employment of an English firm is that the experience gained in producing the coarser and less prominent work in the dome might create a national school of mosaicists capable of executing in a satisfactory manner the better seen, and, therefore, more delicately worked pictures with which it is hoped the nave and choir of the cathedral may eventually be adorned. These could hardly, at present, be attempted with much prospect of success by any firm we are acquainted with, but four or five years' experience on the decoration of the dome may reasonably be expected to produce a school of artists quite competent to undertake hereafter any work they may be called upon to execute. As the area of the dome is calculated by Mr. Penrose at a little in excess of 16,000 square feet, the price of the mosaic at from 30s. to 35s. would range from £24,000 to £28,000.

Collecting these figures together, the total estimate will stand as follows:—Mr. Leighton, £4,800; Mr. Poynter—lowest, £7,000; highest, £10,600. Mr. Stannus, £1,000. Mr. Penrose (four or five years for supervision and assistance)—lowest, £1,200; highest, £1,500. Translation into mosaic—lowest, £600; highest £1,000. Scaffolding—lowest, £1,000; highest, £1,200. Reflectors, £400. 16,000ft. of mosaic—lowest £24,000; highest, £28,000. Add 10 per cent. for contingencies—lowest, £4,000; highest, £4,850. Total—lowest, £44,000; highest, £53,350.

These figures must of course be considered only as approximate in the present state of the case, but, taken altogether, the sub-committee see no reason for doubting that the dome of St. Paul's may be effectively decorated in mosaic for a sum of about £50,000, and, unless some unforeseen difficulties arise, that it is as likely that something may be saved on this estimate as that it should be exceeded. To meet this expenditure there are investments at the disposal of the executive committee for the completion of St. Paul's, subject, of course, to the assent of the dean and chapter, which cost £42,492 10s., and which, if now sold, would probably realise at least a like amount. The interest accruing on this sum amounts at present to £1,570 2s. 6d. per annum, and as the work will extend over four or five years, and only from £3,000 to £4,000 be required in the first year, £4,000 may be reckoned upon to be added from this source. The committee will be in a position to judge whether the public will subscribe the amount that may still be required for completing the entire design in mosaic when they see the full-sized cartoon representing in facsimile one-sixth of the whole work fixed up in the dome. That cartoon must be prepared before any contract which will prove a binding liability on either party can be formed with the mosaicists.

All, therefore, that the sub-committee ask the executive committee at present to sanction is that they be allowed—first, to enter into a contract with Mr. Leighton for the preparation of a cartoon for one of the large circles at an expense of £600, with the understanding that if the work is proceeded with he is to be employed, if he wishes it, for the other seven great circles on similar terms. Second, in like manner to contract with Mr. Poynter for all the figure subjects on two of the ribs, and all the others in the intermediate space, at a price not to exceed £1,550, with a like understanding as to the remainder. Third, to employ Mr. Stannus to prepare the full-sized cartoon as above described; and, fourth, to engage the services of Mr. Penrose till at least this cartoon is fixed *in situ* on the dome, by which several proceedings, with their incidental minor expenses, a total liability will be incurred of from £3,500 to £4,000. It is calculated it will require at least one year from the time of giving the orders to complete these preliminary works, before which time it will not be necessary to ask a sanction for any further expenditure that may be determined upon.

With reference to the subjects it is intended should be represented in the circles and other parts of the dome, the sub-committee beg leave to annex to this report three memorandums, suggesting schemes prepared by Mr. Oldfield for their assistance in this respect. For the reasons adduced by Mr. Oldfield, as well as those which occurred in subsequent discussions, the sub-committee have unanimously come to the conclusion that subjects taken from the Book of Revelation are those most appropriate for the adornment of the dome. This seems the proper place for Apocalyptic subjects, and artistically it may be feasible to treat such subjects in a broader and bolder style than would be possible with more dramatic and pictorial scenes drawn from the Old and New Testaments. These would demand a more elaborate and delicate treatment, appropriate to some position better lighted and nearer to the eye, which it is thought might hereafter be assigned to them in the nave and choir of the cathedral.

With regard to the special visions to be selected from the Apocalypse for illustration in the dome, the sub-committee have, in the course of their deliberations, taken advice from high theological authorities, and, without wishing to insist on each detail, they are of opinion that the scheme suggested in Mr. Oldfield's third memorandum is well adapted both on theological and artistic grounds for the purposes required.

It is presumed that the eight spandrels or pendentives under the Whispering Gallery will all be decorated with colossal figures in mosaic, either in completion of the scheme already begun from the design of Messrs. Watts and Stevens, or in pursuance of some new or modified scheme which may hereafter be preferred. When this is decided upon, it will be the next duty of the executive committee to authorise the preparation of a scheme for the decoration of the drum of the dome, above the Whispering Gallery, which shall harmonise with the subjects above and below it, and without which, in the opinion of the sub-committee, the decorations of the dome will never produce the intended effect or be justly appreciated. If this is done, the rest of the decoration, from the dome down to the ground, must then be taken in hand conjointly with the scheme for the decoration of the nave and choir. For all this, however, there is more than sufficient time. Assuming that the decoration of the dome is taken in hand immediately, four or five years must elapse before its mosaics could be completed, and during that time there will be abundance of leisure for experiments on a full-sized scale in other parts of the building, which will enable the committee and public to determine which mode of treatment is likely to be most successful.

The following is the "Chapter Minute" referred to at the commencement:—

Extract from Minutes of Chapter, held 6th of July, 1878:—"Cathedral Decoration.—The report of the sub-committee for the completion of the cathedral was submitted by the dean. Resolved—'That the dean and chapter assent to the experiment proposed in the last paragraph on page 7 of the report of the sub-committee, without, at the moment, pledging themselves to go further. That the E section (Nos. 7, vii.) of the dome be selected for the proposed cartoon. That the Dean and Chapter reserve to themselves full powers of discussing all the other subjects proposed by the sub-committee, as also of rejecting the cartoons if they should prove unsatisfactory.' "JOHN B. LEE, Chapter Clerk."

The parish church of Heswall, Cheshire, having been for some time in a very dilapidated condition, it has been determined to restore the tower and to rebuild and extend the church to the north-east. The additions have been designed by Mr. J. F. Doyle, architect, Liverpool, under whose superintendence the restoration is being carried out.

The Bournemouth Improvement Commissioners discussed at their last meeting a letter received from Messrs. Shaw and Son, whose tender, the lowest sent in, for the construction of a new pier in accordance with Mr. E. Birch's designs, was recently accepted at £19,273, saying they had made an error of £723, and asking to be allowed to alter it to £19,960. A protest was also received from Messrs. Bergheim, the next lowest tenderers, complaining that Messrs. Shaw had not sent in a bill of quantities as required by the printed conditions. It was resolved to advertise for fresh tenders.

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NEW PAVILION AND WINTER GARDEN AT BLACKPOOL—THE GATEHOUSE, ST. MARY'S ABBEY, THORNTON—TYNEMOUTH PRIORY CHURCH—WORKMEN'S COTTAGES, MISSION CHURCH, AND MIDDLE-CLASS COTTAGE RESIDENCES.

OUR LITHOGRAPHIC ILLUSTRATIONS.

TYNEMOUTH PRIORY CHURCH.

THE first church at Tynemouth was built during the reign of Edwin, King of Northumbria, soon after his conversion by St. Paulinus. This church was of wood, but was reconstructed of stone by St. Oswald, in the 7th century. The body of St. Oswin was enshrined here, and through it the church obtained a wide reputation. The monastery suffered much from attacks by the Danes, and was several times largely rebuilt. Earl Tosti refounded the monastery in the 11th century, and the monks of St. Alban's, to whom the monastery had been given by Robert de Mowbray, the Norman Earl of Northumberland, carried on the works. At the end of the 12th century the whole of the eastern portion of the church was rebuilt on a larger plan, with features and details of the more developed style of that period. The character of this work is scarcely to be surpassed by any other building of the same age. The groining of the eastern bay is curious, and worthy of notice. A stone screen was erected across the eastern arch of the nave, and the nave was set apart, as at St. Alban's, Bridlington, Croyland, and other places, for use as the parish church. The church has been brought to its present state of ruin more by wilful destruction than by decay and exposure to the severe storms which sweep this coast. Two or three years since the late Sir Gilbert Scott was requested to make a survey of the remains of this most interesting building, with a view to the restoration of the eastern part. A careful study of the remaining portions, with the aid of old drawings showing the church as it stood in the last century, enabled him to trace out the ancient design with great certainty, there being but few details for which evidence could not be found. The drawing of the interior, showing the proposed restoration, from which our illustration is taken, was made by Mr. John Norton for Sir Gilbert Scott. No portion of his work has yet been carried into execution. We are indebted for the opportunity of reproducing the drawing to the Rev. T. Featherstone, the vicar of the church.

ENTRANCE GATEWAY TO ST. MARY'S ABBEY, THORNTON, NORTH LINCOLNSHIRE.

THE name of Thornton is derived from Thor, the ancient Northern deity, and its magnificent abbey was founded by William, Earl of Albemarle. The entrance gateway to the abbey is by far the most perfect of any of the buildings of the monastery, is an imposing structure, and one of the finest existing in any part of England. It is of the Perpendicular style, and was built about 1382. The western or exterior front is defended on both sides by massive brick walls, with an arcade of pointed arches on the inside supporting a wall behind, and terminating in two dwarf towers. A small portion of the massive oak door, well studded with nails, is still hanging on its hinges, but has now advanced a far way to destruction; and a portcullis, the groove of which still exists in the outer jamb of the doorway, completed the defence. Owing to the disturbed state of the country or the dread of invasion, it being situated near to the mouth of the Humber, the additional outworks necessary were added at a subsequent period. The gate-house itself is built chiefly of brick, cased with stone. The outer face, or western front, is built partly of brick, with stone dressings, the design being very boldly treated; its pointed arch is richly moulded with flowers and sculptured heads in one of the hollow mouldings. Next to this is another slightly-pointed arch, with hanging foliations, with the flower ornament inserted in a hollow in this as in all other cases where it is introduced, and most of the gargoyles are now either destroyed or very much decayed. This front is divided by four octagonal turrets into three compartments; in the centre one, and immediately over the archway below, are three elegant niches in two stages, and good canopies; the panelled and moulded pedestals to the lower stage has a shield and a cross in the front panels. In each side compartment is a similar niche, one of which also retains a figure—the others have disappeared. The three largest, however, remain, and are in a very good state of preservation. The centre of the three is the Blessed Virgin, to whom the abbey was dedicated, and over her head may be descried a very rare and remarkable representation of the Holy Trinity. The archway is groined, and has sculptured bosses and moulded ribs springing from good corbels panelled in the lower part; the upper part is ornamented with foliage, like the capital of a pillar. The manner in which the mouldings of the ribs are made to intersect each other at their springing is very clever and interesting. The inner face, or eastern front, has also four octagonal turrets, and contains several fine and pleasing details. Over the large east arch is a very elegant oriel window, boldly projected, and has annular heads carved in one of the hollow mouldings. It is flanked at each angle with panelled buttresses, surmounted by crocketted finials; each bay is divided into two lights, with an embattled and moulded transom across. The roof is of stone, supported on the interior by moulded arched ribs. Over this is another window of four lights; two of the mullions of the lower stage, with a portion of the sill, has been taken away: the label mould terminates with two well-sculptured heads. Between the walls are numerous long and narrow passages, leading to rooms which, from all appearances, have been used as guard-chambers. Ascending the winding stair in one of the eastern turrets we soon enter a spacious and noble apartment, the refectory; it is lighted on the south side by a pointed window of four lights, with plain chamfered jambs and mullions, and on the east side by the oriel window; the recess is very boldly and characteristically treated, and it appears to have been used as a chapel. On each side of this recess is another pointed window of two lights, with moulded jambs and mullions, and a quatrefoil in the head; on the north end is a large open fireplace with moulded jambs and arch. There was originally another room of the same size over it, probably the scriptorium; several corbels which supported the floor of this chamber still remain—it is lighted by a pointed and cusped window of three lights divided by transoms. Again, ascending the turret stair we find the top has a very good groined vault, with foliated ribs of singular but elegant design. The turrets and parapets have all lost their terminations, but they would have been most probably finished in an embattled style. The original roof has long since disappeared, and the late Earl of Yarborough caused a new roof to be erected over the gatehouse. While it in no way disfigures the building it has the twofold effect of preserving it from wet and decay, and of affording safety to the visitor, who from the top may obtain an extensive view of the surrounding country, comprizing the Humber, the town of Hull, the Yorkshire hills, and the Brocklesby woods. This building is among those to be visited by the Architectural Association during their ensuing excursion.—B. PRIESTLEY SHIRES.

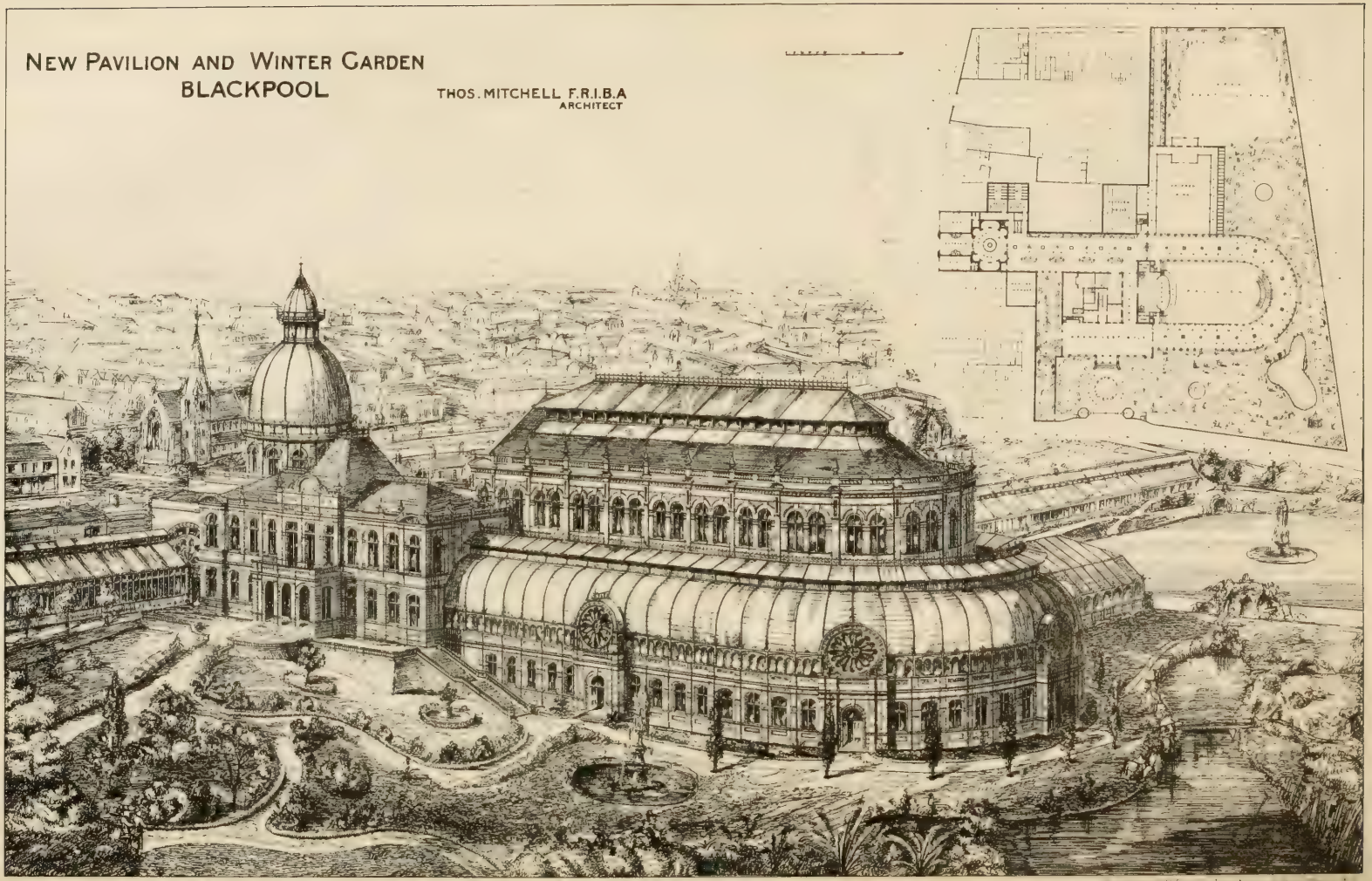
NEW PAVILION AND WINTER GARDEN, BLACKPOOL.

THIS building, which we illustrate, was opened last week. The architect is Mr. T. Mitchell, F.R.I.B.A., of Manchester and Oldham. The winter gardens, pavilion, and skating rinks were commenced about two years ago. The style adopted is Italian. The entrance in Church-street is surmounted by a glass dome 120ft. in height, and 126ft. in circumference. In the vestibule formed beneath is a fountain, surrounded by ferns, tropical shrubs, and statuary. From this vestibule access is gained to the floral hall, an apartment 176ft. in length, 44ft. wide, and 25ft. high. The grand promenade is a continuation of the floral hall, and is carried round the pavilion, which is the main feature of the buildings. The promenade is of equal width with the floral hall, and its length is 423ft., with a height of 25ft. Flowers and shrubs are its chief adornments, but there is a large array of sculpture, including some finely-executed allegorical representations of the Four Seasons, and copies from Canova, Gibson, Duret, Donatello, and other artists. There are also some busts of members of the Royal family, and of eminent musicians. The grand pavilion length is 155ft., the width being 75ft., and the height 60ft. The floor is somewhat lower than that of the grand promenade, which surrounds and overlooks it, and, by an arrangement of revolving shutters, it can be entirely shut off, with a view to musical and theatrical performances, for which purpose a spacious proscenium has been constructed. The pavilion is surrounded by a gallery, and at night is lighted by three gasaliers of 150 lights each. The mural decorations and the painting of the ceiling have not yet been commenced. The general dimensions of the structures are as follows:—Church-street entrance, 32ft. long, 22ft. wide, 25ft. 6in. high; statuary hall or dome, 42ft. diameter, 120ft. high; lavatories and cloak-rooms; promenade (including dome, floral hall, &c.), 780ft. or 260 yards; pavilion and concert hall, 133ft. 6in. long, 72ft. 3in. wide, 54ft. high, six dressing-rooms attached thereto; grand vestibule to Victoria-street, 107ft. long, 36ft. wide, and upper room; ferneries, 190ft., average width, 24ft.; indoor skating rink, 135ft. long, 88ft. wide, 40ft. high, 11,880 sup. feet; outdoor skating-rink, 160ft. long, 160ft. wide, 23,200 sup. feet, total 35,080 sup. feet; rink refreshment room, 42ft. by 30ft.; dining-room, 73ft. by 30ft., with the necessary kitchens; two refreshment-rooms, each 50ft. by 30ft. The whole of the space under the pavilion is cellared, and to be used as storage, or for bowling allies, shooting galleries, and other amusements. A house for the propagation of plants has also been provided, 160ft. long by 22ft. wide. Messrs. Cardwell and Sutcliffe, Fielding and Son, and Curwen and Swain, were respectively the contractors for the brickwork, masonry, and joinery work; Messrs. Braby and Co. for the zinc work, and Messrs. Minton, Hollins, and Co. supplied the tiles. The floor area of the building exceeds two acres. More than three million bricks have been used in the building, and the total weight of material handled in construction was nearly 18,000 tons. The glazing of the whole of the Winter Gardens has been done on Rendle's patent system. The dome is about 120ft. in height, and can be seen 15 or 20 miles at sea. It has a very light appearance, and has stood well against some of the fiercest gales that have ever swept over the Atlantic. The mode of fixing the glass is very simple—light cross-bearers, or purlins are fixed horizontally to the main principals of the roof, and to these are fixed zinc or copper grooved bars, in which the glass slides, and is lapped vertically, or a small bar is inserted between the glass.

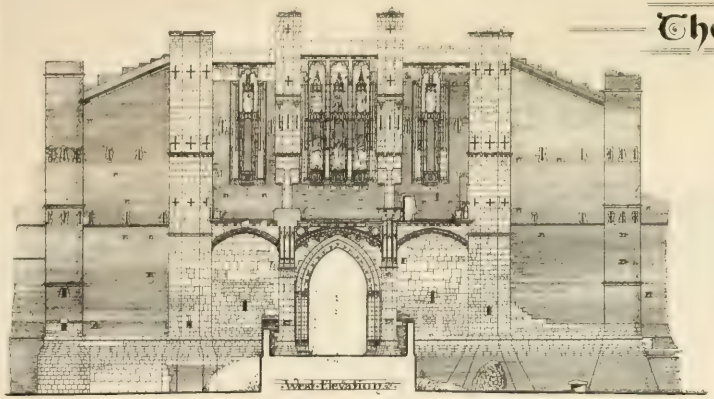
WORKMEN'S COTTAGES, AND OTHER BUILDINGS IN SLAB CONCRETE.

FOR description of these illustrations see article on page 46.

The memorial stone of a new Wesleyan chapel was laid at Shrewsbury on the 8th inst. The building will be chiefly of brick, and the style, according to a local paper, is "Old English and Italian." The chapel will seat 630 persons. The architect is Mr. G. B. Ford, Burslem, and the builders Messrs. W. and J. Gethin, of Shrewsbury.


NEW PAVILION AND WINTER GARDEN
BLACKPOOL
THOS. MITCHELL F.R.I.B.A
ARCHITECT

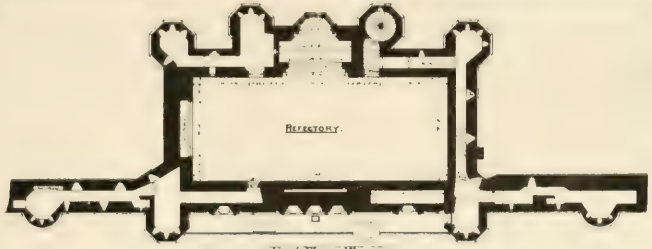
The Gatehouse



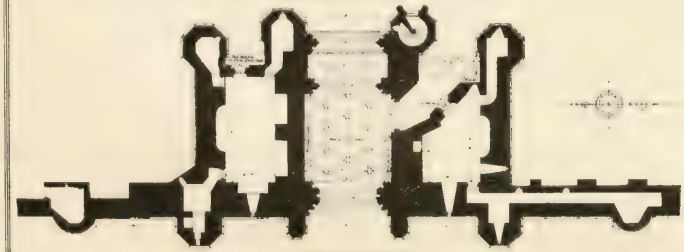
West Elevation

East Elevation

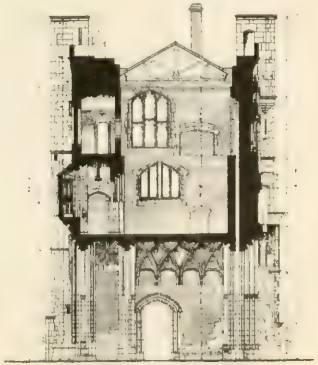
St. Marys Abbey Thornton
N. Lincolushire



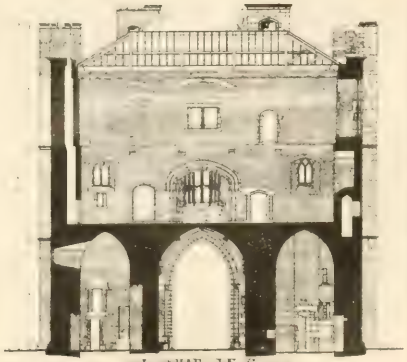
First Floor Plan



Ground Plan



Transverse Section



Longitudinal Section

CHAPTER HOUSES.

THE Chapter Houses of Chichester and St. David's have no bench tables. They form upper chambers.

It is most important to correct good John Britten's misapprehension that the forms of Chapter Houses varied with their date. It was determined and discriminated by the want of each community. I have not the time, nor have you space to give in detail, the ritual reasons, but classification is indispensable. (1) *Benedictine*, oblong—Canterbury, Gloucester, Chester, Durham [once apsidal] [Winchester]. Exceptions: Worcester round; Westminster polygonal [Evesham, Belvoir] (Norwich was apsidal).

(2) *Cistercian*, square, with three alleys—Kirkstall, Fountains, Buildwas, Furness, Netley [Tintern, Beaulieu]. Exceptions—Margam, polygonal. Cleeve, oblong.

(3) *Cluguiacs*, oblong—Wenlock.

(4) *Austin Canons*, oblong—Bristol, Oxford [St. Andrew's]. Exceptions—[Bolton, Thornton] polygonal, and (5) *Praemonstratensian*, Caverham.

(6) *Secular Canons*, polygonal — York, Sarum, Lichfield, Lincoln, Wells [St. Paul's,] Hereford, Southwell, Howden, Elgin. Exceptions (oblong)—Exeter, Chichester, St. David's, Ripon, Glasgow. See also my "Sacred Archæology." Priory chapter houses were oblong. Several so-called chapter houses were really sacristies. MACKENZIE E. C. WALCOTT.

COMPETITIONS.

BODMIN.—A meeting of the Bodmin Town Council was held on Thursday week, to receive the report of a committee of the whole council, appointed for the purpose of inspecting the seven plans sent in for the new Guildhall and municipal buildings, and selecting the most suitable. The committee recommended that the plan with the motto "One and All" should be adopted, provided that it could be carried out at a cost not exceeding £3,000. Colonel Alms conplained that an architect, who was understood to be a competitor, was met on the site selected for the buildings by a majority of the building committee, and shown over the place by them. This same gentleman had also been in the room where the plans were hanging with a member of the committee, and his conduct, he considered, was calculated to create great dissatisfaction in the minds of the other competitors. With reference to the first statement made by Colonel Alms, the Mayor said that no further favour was shown to Mr. Trevail than it had been decided by the council should be shown to any architect who desired to visit the site. Mr. John Oliver admitted that he had taken Mr. Trevail, at his own request, to see the various plans, but he did so in perfect good faith, and not a word of comment was spoken by either. If he erred it was in ignorance, and he was sorry for it. Mr. W. H. Higgs said the plans were open for public inspection, but at the same time he considered Mr. Trevail showed very bad taste in asking to see the plans. Mr. Phillipps proposed that if Mr. Trevail had sent in a plan it should not be entertained. Mr. Phillipps, however, could find no seconder, and the proposal consequently fell through. Mr. Jos. Stephens proposed the rejection of the report on account of the site chosen, and on the ground that the building of a new hall was inopportune. Besides, almost without exception, those who had seen the various plans and spoken with him on the subject considered, he said, five of the other six plans superior to the one selected. Colonel Alms seconded the amendment. Mr. Collins said, although he should not have himself selected the plan chosen, yet, as he had not attended the committee meetings, he would vote for its adoption. After an animated and somewhat heated discussion, five voted for the rejection of the report, Messrs. Alms, Grose, Phillipps, Sandoe, and Stephens; and eight for its adoption, Messrs. Baron, Crang, Collins, Higgs, Marshall, Oliver, Ireland, and Williams. The report of the committee was therefore declared adopted. The plan selected is generally supposed by those who are acquainted with the characteristics of his style, &c., to be that of Mr. S. Trevail.

GREAT YARMOUTH.—We understand that the plans for the erection of the new town hall are open to the inspection of the public at the town hall between the hours of 12 and 4 in the afternoon, and 6 and 8 in the evening. Mr. Boardman, architect, of Norwich, has been deputed by the town council to draw up a professional report on the merits of the different designs sent in for competition for the prizes offered, and commenced his duties on Thursday week, July 11th.

KENSINGTON.—Although tenders have lately been received for the execution of Mr. Robert Walker's design for the new Vestry Hall at Kensington, selected, it will be remembered, in competition, the matter has yet to receive further consideration, it having been determined to include the site of the two adjoining houses, and so considerably enlarge that on which the new building is to be erected. Mr. Walker has received instructions to prepare a fresh design for this purpose.

NOTTINGHAM.—The competition of designs for the new schools which are about to be built in Queen's-walk by the Nottingham School Board was settled on Thursday evening last. There were eleven sets of designs submitted for these schools, and of these the best and most suitable, in the opinion of the Board, were those by Mr. A. N. Bromley, architect, Weekday-cross, Nottingham. The second place was awarded to the plans by Mr. A. H. Goodall, architect, Market-street, Nottingham. The second competition was for schools to be built in Coventry-road, Bulwell, for the same School Board. For these 12 sets of designs were sent in, and when the envelopes were broken it was found that Mr. A. N. Bromley was again the successful competitor, while Mr. J. W. Keating, architect, of the Pavement, Nottingham, was placed second. The Board report that on the whole the designs were certainly above those of former competitions in merit. Another competition, which is expected to be for larger schools than those just competed for, will take place at the end of August. These will be for Hunger-street Schools for 1,020 children. These will be arranged on the "class-room" system. Another school is also to be built in Baldwell Quarry-road for 400 on the usual mode of planning.

ARCHITECTURAL & ARCHÆOLOGICAL SOCIETIES.

ROYAL ARCHÆOLOGICAL INSTITUTE.—The monthly meeting of the institute took place on Friday; the President, Lord Talbot de Malahide, in the chair. Mr. John Henry Parker, C.B., gave particulars of the progress of the excavations in Rome, one of the principal of these being the removal of accumulations of earth from the so-called Stadium, a space which he thought ought more properly to be designated a gymnasium. For this work a contract had been entered into by the Government, which will take two years to execute, 20ft. of earth requiring to be removed. Another great work approaching completion is the excavation of the Via Sacra, which may settle the question as to how far that name was borne by the temple-lined thoroughfare passing through Rome. He believed it extended past the Forum to the Temple of Saturn, and perhaps to the Gate of Severus. The excavations in this Sacred Way would be, he expected, amongst the most interesting ever made in Rome. At present the discoveries of ancient remains or inscriptions had not been very important. Professor Bunnell Lewis read a paper on "The Architectural Antiquities of South-West France," illustrated by a series of water-colour drawings by the late Rev. J. L. Petit. This isolated and mountainous corner of France contains few Roman remains, and scarcely any mediæval works. The people are Basque, and speak a patois Spanish rather than French, and more nearly approximating to Latin than to either of those modern tongues. The Roman remains are almost confined to an excellent network of roads and inscriptions relating to their repair. Of later remains the most curious are the scanty mosaics, which exhibit a wonderful variety in pattern and the introduction into the decoration of the flora of Southern Europe. Those at Béarn and Bielle are especially noteworthy. The sarcophagi in churches are occasionally decorated with sculptured panels representing New Testament scenes, but with an essentially Roman treatment and grouping—a combination of Christian symbols with Pagan workmanship. The churches are mostly of the type known by the French as Romano-Byzantine, and in many cases were fortified during the middle ages. Generally they are planned as a Latin cross, with very simple outline, but an instance exists of one forming a Greek cross. At Leschar Cathedral a vacant space is left in the centre of apse for the bishop's chair—apparently a traditional reproduction of the prætor's chair in the Roman justice-halls. In later buildings the portion of the chair more or less agrees with the English use. In reply to Mr. Clarke, Prof. Lewis said he noticed no marked difference between church architecture of pure Basque and the Latin-descended races which inhabit the district. The books of the local *savants* were very inaccurate, and should be read with much caution. The President exhibited a series of antiquities he had just brought from Athens, including a large celt of nearly pure copper, and numerous flint flakes from Marathon and other districts of Greece. The latter had been averred to be relics of the Persian army, but their occurrence elsewhere, together with that of celts, showed that they must be attributed to a far earlier, and indeed prehistoric race. A series of gold and silver rings were described by Mr. R. Ready, including a Roman intaglio of Antinous as Hercules, in a Chalcedony-Sard, set in a massive gold enamelled thumb ring, a rudely engraved dark sard, set in a gold ring of heavy close filagree work, a mediæval gold ring, with a merchant's mark and initials "S. I.," and an intricately twisted gold ring, forming a knot, probably Italian work, and some singularly twisted silver wire thumb rings, of large size and rude workmanship, from Scandinavia. A letter was read from Mr. Watkin, stating that at Holt, Norfolk, a labourer had found an amphora filled with nearly a hundred-weight of Roman coins, many thousands in number, chiefly of brass, and of the date of Faustinus.

THE EXCAVATIONS ON MOUNT CABURN.—At a recent meeting of the Society of Antiquaries, General Lane Fox communicated a paper detailing his excavations and researches in the pits and camps at Mount Caburn, near Lewes, and at the same time exhibited the objects found, including pottery and wattling-sticks. The author suggested that the first construction of Mount Caburn was during the late bronze or the early iron period, and that its occupation continued into Roman times, though it does not seem to have been occupied by the Romans themselves. One large and thirteen small pit-dwellings were opened, corresponding with others found at Cadbury, Ewell, Newstead, Stone, Springfield, Tilbury, Richborough, Chesterford, and other parts of England. The ramparts of the camp and the various lines of defence were mapped out and explained by the lecturer, who endeavoured to show, from an examination of fragments of wattling and the stakeholes, the precise size and shape of the stockade and the distance apart of the stakes. With these remains were compared the accounts in Cæsar of ancient fortifications and the extant examples of Gaulish ramparts in France.

Plans have been approved by the Metropolitan Board of Works for a new church to be erected from the designs of Mr. J. E. K. Cutts, of London, in Panmure-road, Sydenham-hill.

On Saturday the memorial stones of a United Methodist Free Church, to be erected in Roundhay-road, Leeds, were laid. The new church is designed in a bold treatment of Romanesque. The plan embraces a schoolroom with infants' room, band-room, class-rooms, kitchen, and heating-apparatus room under the chapel. The whole of the outside ashlar work will be of Meanwood stone, with Meanwood and Potternewton stone wallstones; the insides of the walls will be plastered, and the inside woodwork will be of pitch pine varnished. The whole of the works have been designed by Mr. D. Dodgson, architect, of 18, Park-row, Leeds, and are being carried out, under his superintendence, by Messrs. Craven and Umpleby and Mr. Charles Myers, builders, of Leeds. The church will accommodate 600, and the schoolroom 250 children. Exclusive of the site, the building is estimated to cost £4,000.

Building Intelligence.

BEDALE.—The new Roman Catholic Church of St. Mary and St. Joseph, Aiskew, was opened last week. The total cost of the church will be about £2,000. The character of the building is that of a small country church of the 13th century, in the Gothic style. There is a nave, chancel, and baptistery, with sacristy, &c., connecting the new church with the presbytery. The walls are of stone, with corner dressings, and also dressings round the windows. The design is by Mr. G. Goldie, of the firm of Messrs. Goldie and Child, of London. Mr. Wood, of Leeds, has been the builder.

HASTINGS.—The memorial stone of a new Congregational church was laid at Mount Pleasant, Hastings, on Thursday, the 4th. The church will be Early English in style, with rose windows above the side lancets, and window openings in the roof. At the south-east angle will be a tower and spire 110ft. high, and on the west side will be a short transept. The external materials will be red brick, with buff terra-cotta dressings. The internal dimensions will be 72ft. × 41ft. 6in., and 26ft. height of walls. The roof will be carried on arched beams in one span; above the collar beam will commence an arched ceiling. Seats of varnished pine will be provided for 530 hearers, and provision made for the future addition of galleries. A platform, approached from minister's vestry, will be provided in lieu of pulpit. The heating and ventilation are to be secured by an underground hot-air stove. In close proximity a lecture-hall is already built, and a schoolroom will hereafter be added on north side of church. Mr. T. Elworthy is architect of, and Mr. Harmer the contractor for, the building, the cost of which, as at present being erected, will be £5,000.

HUDDERSFIELD.—On Wednesday week the double ceremony of opening the new borough building and laying the foundation stone of the new town hall, at Huddersfield, was performed. The borough building is 93ft. long and 70ft. wide. The Town Council room is 44ft. long, 26ft. 6in. wide, with two entrances. The building has been erected at a cost of under £9,000, from designs prepared by Mr. J. H. Abbey, the borough surveyor. The new town hall will front Princess-street. The court-room will be 58ft. long, 37ft. wide, and 20ft. high. There will also be a large public hall. The outside dimensions are 154ft. from Princess-street to the new borough offices, and 72ft. from Peel-street to Corporation.

HUGGLESCOTE.—The foundation stone has been laid of a new church at Hugglescote. The new church is to be in the Early Gothic style, the interior measurement being 78ft. long, 46ft. wide, and 50ft. to the apex of the nave roof. There will be sittings in it for 450 adults and 108 children. The church will consist of north and south aisles and baptistery. The exterior of the building will be constructed of Bardon stone, with Doulting dressings, and the interior of Ibstock pressed bricks and Corsham Down dressings, with a portion in Ancaster stone. The floors will be of encaustic tiles, with borders of an approved pattern, and flushed in with Portland cement. The church is designed to accommodate about 600 persons, but the portion to be erected now will seat about 100 short of that number. The contract amounts to £4,198, exclusive of the site. The architect is Mr. J. B. Everard, of Leicester; the builder Mr. King Vann, of Leicester; and the clerk of the works Mr. Taylor.

METROPOLITAN BOARD OF WORKS.—At the weekly meeting of this board on Friday, Mr. E. Dresser Rogers was elected vice-chairman of the works committee for the ensuing year. A letter from Mr. H. A. Hunt, jun., on behalf of Earl Cadogan, suggesting an arrangement for an exchange of land so as to widen Queen's-road, West, as an approach to the Chelsea Embankment having been sonsidered, a reply was directed to be sent, declining to co-operate in the suggested arrangement. The bill for the acquisition of Plumstead-common and Shoulder-of-Mutton-green having received the Royal assent, it was referred to the works committee to settle the terms of the agreement under the new Act for the sale by Queen's College, Oxford, and the purchase by the board of the estate and interest of the college in these open spaces. It was decided to open a further portion of the Oxford-street to Old-street improvement on Saturday, the 3rd August. A letter from the City Commissioners of Sewers, stating that the cost of completing the improvements at No. 139, St. Mary-at-Hill, and No. 1, Little Tower-street, is estimated at £7,219, was referred to the finance committee; another from the Royal Institute of British Architects, stating that they are ready to assist the Board with practical suggestions, when they are preparing their bye-laws, under Clause 15 of the Metropolis Management and Building Acts Amendment Bill, was sent to the Building Act committee; and one from Mr. J. W. Booker, stating that as the consideration of the tenders for hoarding and shoring has been re-opened, he is not desirous of adhering to his original tender, and asking to be relieved of further work in connection with dangerous structures, on account of his state of health, was referred to the works committee. The board's contractor was instructed to carry out the work ordered by the magistrates to be done at the following premises, being dangerous structures:—3, Searle-street, Lincoln's-inn-fields, St. Giles-in-the-Fields; party-wall, between No. 24, New Bond-street, and 31, Conduit-street, St. George, Hanover-square; party-wall, between No. 180 and 181, Drury-lane, St. Giles-in-the-Fields; No. 1, 2, 3, 4, 5, and 6A, Angel and Porter-court, St. Luke; 126, Gray's-inn-road, St. Andrew, Holborn.—The following applications for loans were granted at the previous meeting of the Metropolitan Board of Works:—Plumstead District, Board, £1,000, for raising and strengthening the south bank of the Thames in Charlton parish; Mile-end Old Town Vestry, £2,000, for improvements in Oxford and Jamaica streets; and the managers of Brentwood School District, £15,000, for purchasing land adjoining their premises at Brentwood, and erection of infirmary and other works. In reference to communications from various local authorities, asking that street-widening works in Walworth-road, Cow-cross-street, Holborn, Bermondsey-street, and between Strand and Holborn (Mr. Teulon's plan), and that the Thames be embanked between Battersea-bridge and Cremorne, answers were sent stating it is not the intention of the board to apply next session for an Act authorising the carrying out of street improvements.

TEIGNMOUTH.—A new Roman Catholic church, dedicated to Our Lady and St. Patrick, has been opened at Teignmouth. The work executed so far has involved a cost of £3,400, and it is proposed to complete the edifice as soon as possible. The church stands north and south, and consists of a nave, chancel, south gallery, and eastern aisle, and at the head of the latter is a Lady chapel. When the western aisle is built there will be another chapel, a calvary, and a permanent confessional. As soon as means permit it is also proposed to build a presbytery. On one side of the front there is a bell turret, and on the other a pinnacle. Over the entrance there is a statue of St. Joseph. The architects are Messrs. J. Hansom and Son, of Westminster; Mr. Slocombe, of Teignmouth, was the builder. The church is built of Devonshire limestone, with Ham-hill stone for the exterior dressings, and Bath stone for the dressings of the interior.

UNIVERSITY COLLEGE.—Lord Granville, on Tuesday week, laid the first stone of some new buildings at University College. These additions will bring the wings of the front up to the line of Gower-street. The architect of the new buildings is Professor Hayter Lewis, and they will cost £50,000 or more. The central portion of the existing building, including its portico and entrance-hall, was erected from the designs of William Wilkins, R.A. In 1832 a boys' school was established, under the control of the Council. In 1833 the University College or North London Hospital was founded, in a close connection with the college. In 1841 the Birkbeck Chemical Laboratory was erected. Since that time the principal additions to the college have been the portions devoted to the Slade School of Fine Art, and the portions of the south wing assigned to the boys' school.

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TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.]

All letters should be addressed to the EDITOR, 31, TAVISTOCK-STREET, COVENT-GARDEN, W.C.

TO OUR READERS.—We shall feel obliged to any of our readers who will favour us with brief notes of works contemplated or in progress in the provinces.

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H. BELL. (Photography has been successfully applied to window decoration; an interesting article on the subject appeared in the *English Mechanic* of July 5, p. 414.)—INQUIRER. (No.)—S. M. (Mahogany was used in repairing some of Sir Walter Raleigh's ships at Trinidad in 1597; but it was not introduced into England till 1724.)—SUB-CONTRACTOR. (The only method used is to measure the rectangle enclosing the stone winder, the dimensions being taken to give a fair allowance for waste. Your sketch gives no dimensions.)—SAMUEL FEY. (The charge for quantities for old building is, according to the surveyor's scale, 2½ per cent. for works of small or difficult kind. When there is no risk incurred, however, 1½ to 2 per cent. seems to us a fair charge.)—W. THORBURN. (Proby's formula for retaining walls is given in several handbooks of construction; you will find the formula and the subject of retaining walls discussed in the "Engineer and Architect's Pocket-Book" (Lockwood and Co.), and the theory of retaining walls has been frequently explained in the BUILDING NEWS. The subject has been treated of by Tredgold, Belidor, Rondelet, Pasley, and many recent experimenters, including several American engineers, the leading points of which we have laid before our readers from time to time. See also the "Transactions of the American Society" for February, quoted in our article.

Correspondence.

THE MANCHESTER TRAVELLING STUDENTSHIP.

To the Editor of the BUILDING NEWS.

SIR,—In the competition for the travelling studentship, recently offered to architectural students by the Manchester Society of Architects, I think it is much to be deplored that they have not acted with greater justice and courtesy towards the competitors, and I shall feel obliged by your inserting the following in your next issue.—

Certain conditions were issued, in which the 11th of May was fixed as the day for the delivery of competitive drawings. Being myself a competitor, and finding the time rather short for the amount of work entailed, I was reluctantly compelled to hurry through my drawings in order to have them ready for the day appointed. On delivery, however, I was kindly informed that the time was extended a fortnight. This extension was simply useless to me, as my drawings were already complete;

whereas, had I known sooner, it would have been most invaluable. But this is not all. On communicating with my fellow-competitors I ascertained that one of them actually received no extension whatever, whilst another (the successful competitor) was granted some ten or twelve days' extension after my own drawings were finally delivered.

I should mention that I only heard the result of the competition when I chanced to call to ascertain if any decision had been made, and to my great astonishment I then learned that the successful competitor had already proceeded on his tour.

I think it would be impossible to conceive anything more ungracious and discourteous than such treatment, and should the Manchester Society of Architects ever enter upon any discussion respecting the grievances of "architectural competitions" I shall certainly be very curious to see what they have to say in the matter.—I am, &c., FRANK L. ELTON.

Manchester, 17th July, 1878.

BODMIN TOWN HALL COMPETITION.

SIR,—The award of the council for the above competition has been that Mr. Sylvanus Trevail's plans be accepted. Will you kindly insert this letter as a protest against the resolution, Mr. Trevail having, contrary to all laws of decency and fair play, inspected the drawings sent in for competition whilst they were still under the consideration of the council, with one of the councillors, this councillor being, moreover, a builder doing work for Mr. Trevail? I enclose my card and am, &c.,

A COMPETITOR.

THE LATE CHARLES MATHEWS.

SIR,—In addition to what has already been said, it may be interesting to note, as it is not generally known, that Charles Mathews' father died at Plymouth, and was buried at the parish church of St. Andrew's there. A white marble tablet tells the following tale:—

' Near this spot are deposited the honoured remains of Charles Mathews, comedian. Born 28th June, 1776; died, June 28th, 1835. Not to commemorate that genius which his country acknowledged and rewarded, and men of every nation confessed, nor to record the worth which secured the respect and attachment of his admirers and friends, but as an humble tribute to his devoted unvarying affection and indulgence as a husband and father, this tablet is erected in sorrowing love and grateful remembrance by his bereaved wife and son.

"All England mourned when her comedian died,
A public loss that ne'er might be supplied,
For who could hope such varied gifts to find,
All rare and exquisite, in one combined?
The private virtue that adorn'd his breast
Crowds of admiring friends with tears confessed.
Only to Thee, O God! the grief is known
Of those who rear this monumental stone:
The son and widow, who, with bosoms torn,
The best of fathers and of husbands mourn.
Of all this public, social, private woe,
Here lies the cause—Charles Mathews sleeps below."

It may be noticed that whilst most of the recent notices upon the late talented actor spell his name with two "t.'s" that upon the father's grave has only one; and further, that Charles Mathews, sen., by a curious coincidence, died upon the anniversary of his birthday. St. Andrew's Church contains, besides the monument just quoted, very many memorials of a most interesting character, and is well worthy of a visit. It is, perhaps, one of the very finest of the Devonshire churches, as it is also the largest. The grand old western tower is of granite, and it was the bells in that belfry which rang out the joy peal when the huge Spanish Armada got so deservedly well "licked" by our dapper little fleet outside the harbour. The interior of the church was thoroughly and most successfully restored by the late Sir G. G. Scott, R.A., shortly before his death.—I am, &c., HARRY HEMS.

Exeter, July 8, 1878.

The chancel of St. Edward's Church, Evenlode, is about to be restored by Messrs. Newman and Sons, builders, at the sole cost of the rector, and at a cost of about £300. The architect is Mr. Cutts, of London.

The church of St. Lawrence, Wyck Rissington, is to be restored this autumn from the designs of Mr. J. E. K. Cutts. The chancel is an unusually interesting specimen of late Lancet work. The work is to cost about £1,100.

The Cockermouth Local Board have decided to allow in future no new houses to be inhabited until a certificate has been granted by their surveyor, stating that the building and sewerage have been completed according to deposited plans.

Intercommunication.

QUESTIONS.

[5434.]—**Creases in Engravings.**—Would any reader inform me how to take the creases out of engravings when framing them?—W. F. BROWNING.

[5435.]—**Winchester Cathedral.**—Perhaps one of your many correspondents will kindly inform me how I can get permission to make drawings of Winchester Cathedral and St. Cross Hospital, or if any is required?—AN ARCHITECT'S PUPIL.

[5436.]—**R. C. Church at Arundel.**—May I trouble some one to inform me who was the architect of the Roman Catholic cathedral at Arundel?—J. H. M.

[5437.]—**Professional Charges.**—About 4 years ago I was directed by a public board to design and superintend some works at a town about six miles from my office. The works were completed three years ago, and I received the usual commission of £5 per cent. on the amount of the contract. I had previously, and have again this year, rendered the board other personal services, for which I have yet to be paid. Last year I was directed to prepare plan, estimate. and specification for a small addition to the previous works, but quite distinct from them. This addition was carried out by a contractor under my superintendence, at a cost of under £20. and involved at least four journeys by me of half a day each, so that the ordinary commission on so small an amount will not be remunerative. Query.—Am I bound to take the work as a whole, and charge only £5 per cent. on the total expenditure, or am I justified in making a higher charge on the second contract? I shall be glad to receive any information as to the customary practice under such circumstances. —BETA.

[5438.]—**Lights.**—Will any of your readers kindly inform me what is the legal distance that a building requires to be set back on its own land, so as to secure lights on a side adjoining another property? —A. T. T.

REPLIES.

[5422.]—**Pulpit in Exeter Cathedral.**—The material used in the Patteson memorial pulpit, in the nave of Exeter Cathedral, is Mansfield Woodhouse magnesia limestone, that in the centre panel being from the celebrated "Memorial" quarry. The whole of the sculpture and carvings were executed by Messrs. Farmer and Brindley, of London.—H. W. B.

[5423.]—**Oak Floors.**—I should recommend "Provincial" to let his oak floors remain as they are for another twelve months.—HARRY HEMS.

[5424.]—**Emigration.**—My idea about a young architect going to Australia or the Colonies is this:—If he is of active habits, and can turn his hand to surveying in all branches; if he has no scruples about particular styles of architecture, and if he can turn builder as well as architect on an emergency, the Colonies afford him an excellent opportunity of making a fair livelihood. If, on the other hand, a young man is a specialist, if he indulges certain whims about style, stands upon his professional dignity, and has no practical acquaintance with building and measuring, the notion of going abroad is utterly absurd. Every student can answer these questions for himself, and determine whether England or the Colonies give him the best prospects for success.—G. H. G.

[5427.]—**Competition Drawings.**—The condition that the designs must not be coloured applies, as a rule, to the elevations and perspective drawings. To colour the woodwork in the sections can hardly be held to disqualify the design, unless the design thrown aside for being coloured was simply so tinted.—ARCHITECTUS.

[5430.]—**Heat Through Walls.**—The cavity between the oven and the new house is scarcely wide enough; a 6in., or even a 12in. hollow, would have been better. Is the space ventilated, or rather, is there a current of air through it? It would be a good plan to have this done, if possible. Another course would be to fill up the cavity with felt, pugging, or some non-conducting substance. I should prefer, however, a well-ventilated cavity, if possible.—G.

[5431.]—**Keeping Down a Spring of Water.**—The only practicable course to keep the water down is to make the underground chamber water-tight. This may be done by puddling the bottom and sides. a good bed of clay, 9in. deep, and then a slightly inverted arch of brick, set in cement, filled up level with concrete, would resist the upward pressure of water. I should turn the arched floor the 9ft. way. It should be 9in. thick.—ARCHITECT.

[5432.]—**Broach Spire.**—A broach, or "broche," is an old English term for a spire springing from the tower walls. The origin of the term "broach" is rather obscure; the term probably is a corruption of the Welsh *procio*, to thrust, or French *brocher*, to spit. I refer "C. C. S." to the term in "Commonplace Column."—A READER.

[5433.]—**Professional Charges.**—Tracings made for local board are usually charged for in addition to the $2\frac{1}{2}$ per cent. The $1\frac{1}{2}$ per cent. for preparing quantities is small enough, and does not include supplying copies to contractors. The $\frac{1}{2}$ per cent. is for procuring and examining tenders only. —ARCHITECT.

STAINED GLASS.

CORK.—A series of nine windows in the south aisle of the new cathedral of St. Finn Barre, at Cork, have been filled with stained glass as memorials to deceased citizens, armorial bearings of whom are exhibited above. The central compartment contains the figures, and is placed between two other lights, each decorated with interlaced geometrical patterns in delicate colours. The subjects, commencing from opposite the baptistery, are:—1. "Adam and Eve working;" 2. "Noah building the Ark;" 3. "Noah offering the sacrifice, and the giving of the Covenant of the Bow;" 4. "Joseph sold to the Israelites;" 5. "Joseph presenting his Father to Pharaoh;" 6. "David with the head of Goliath;" 7. "David before the Ark of the Covenant;" 8. "Nehemiah petitioning Artaxerxes;" and 9. "Nehemiah rebuilding the walls of Jerusalem."

HUNTINGTON, YORK.—Another stained glass window has been inserted in the chancel of Huntingdon Church. The window, which is the east one, is of three lights, with tracery above. The subjects portrayed are "The Nativity," "The Crucifixion," and the "Resurrection," each of which occupies a light, the Crucifixion being the central. The window has been executed by Hardman and Co., Birmingham, from the design of Mr. D. A. Walter, architect, Hornsea.

STAINED GLASS IN THE PARIS EXHIBITION.—Among the exhibitors in this department, Messrs. Camm Bros., artists in glass, Birmingham, may be mentioned for some excellently-designed windows for domestic work. We notice a window embodying illustrations of the fairy part of Shakespeare's "Midsummer Night's Dream." The figures of Oberon, king of the fairies, giving Puck instructions, Titania, the queen, and Puck are well sustained. But some hall windows in three lights, 5ft. 9in. × 1ft. 8in., are especially worthy of mention. The subjects of the design are taken from Tennyson's "Idylls of the King." The centre light shows the sacred Mount of Camelot, where Arthur holds court with the Knights of the Round Table. The subject is suggested from the "Holy Grail":—

O! brother, had you known our Camelot,
Built by old kings age after age so old;
The king himself had fears that it would fall,
So strange, and rich, and dim.

The lower part of the window is occupied with figures of knights and ladies, with the "mighty hall which Merlin built" in the background rising in pyramidal stages. It is a fine composition, and there is a semi-mystic meaning and quaintness in the design that commends itself. In the side lights are other subjects from the same poem. We have before us the design of another cleverly conceived three-light ecclesiastical window, representing the Parable of the Wise and Foolish Virgins. The figure of the Saviour occupies the centre light, and the two groups of virgins are admirably introduced in the side lights. The artist has aimed rather at ideal expression in the composition of his figures and accessories. Messrs. Camm, we note also, send some transom lights and curtain panels, with emblematic designs of the Four Seasons, Music, Archery, Falconry, and Spring, in the Classic and Queen Anne styles.

At the recent fire at Messrs. Smith and Co., of Compton-street, Goswell-road, the whole of the books, &c., of the firm, which were locked up in Messrs. Chubb's safes, came out uninjured. The conflagration was an unusually severe one, the building being stored with oils, tallows, and other such inflammable articles. This is the second large fire within a very short time at which the books and valuables have been saved in Messrs. Chubb's safes.

At a vestry meeting, held at St. Nicholas Church, Guildford, the design submitted by Messrs. Clayton and Bell, of Regent-street, W., for the Dr. Monsell memorial reredos to be erected in the church, was approved, and a resolution was passed requesting the ordinary to grant a faculty for the erection of the reredos.

On Monday morning Mr. Jethro Robinson, the architect to the Lord Chamberlain, expired very suddenly at his residence, Bloomsbury-square. It is supposed that the death was from heart disease. Deceased was the architect to Sanger's Royal Amphitheatre, Alexandra Theatre, Grecian, City-road, and theatres at Leeds, Hull, and other large provincial towns.

A block of buildings for stores, workshops, reading-rooms, &c., was opened on Saturday, July 6th, in connection with the Home for Little Boys, Farningham-road, Kent, by the Countess of Zetland, and the foundation stone of an additional house was laid by Mrs. Horniman on behalf of the donor. Messrs. Spalding and Evans were the architects, and the contractors W. Downs and Co., of Southwark.

The rural sanitary authority of the parish of Frimley have taken steps towards the sewering of their district by consulting Mr. James Lemon, of Southampton, thereon.

WATER SUPPLY AND SANITARY MATTERS.

DRAINAGE SCHEMES FOR THE LOWER THAMES VALLEY.—The Lower Thames Valley Main Sewerage Board recently considered a tabulated statement as to the various sewerage schemes submitted in competition by engineers. Five of the schemes propose precipitation, nine irrigation, one joint irrigation and precipitation, and one is alternative. The highest estimate is that of Messrs. Donaldson and Davenhall, who propose to take the sewage to Chobham and Bisley (for irrigation) at a cost of £592,600. The lowest is that for No. 2 scheme, propounded by Messrs. Gotto and Besley, of Westminster, in which it is proposed to deal with the sewage by precipitation at Ham-fields, for £126,786. No decision will be come to at present.

FARNHAM, SURREY.—The Local Board of Farnham have lately received a report from Mr. James Lemon, M.I.C.E., of Southampton, whom they have consulted upon the sewerage and utilisation of the sewage of their district, in which it is proposed to utilise the sewage by irrigating certain lands near the union, and to the north-east of the town. By the adoption of this report, all possibility of polluting the River Wey, which runs through the town, will be precluded. The land proposed to be irrigated being at a greater elevation than the town, pumping will have to be resorted to, it appearing that no land suitable for the purpose is obtainable at a level which will admit of the town being sewered by gravitation.

BLANDFORD, DORSET.—A Local Government Board inquiry was held a fortnight since at Blandford, before Mr. S. J. Smith, C.E., as to an application from the local board for sanction to borrow £600 for permanent works—including widening of a street, re-paving foot-paths partly with Keinton stone and partly with asphalte, and kerbing. The inspector condemned tar pavement on account of its non-durability and difficulty to repair, and it was decided to amend the application to one for borrowing £700, and to have all the paving in stone. It transpired that there is no regular system either of sewerage or water supply in the town, and the inspector expressed a strong opinion on the probable contamination of the present well-water supply from the "vaults" (dead wells) attached to every three or four cottages throughout the district.

The newly-appointed Corporation of Accrington have reappointed Mr. Eli Knowles, surveyor to the late local board of health, as borough surveyor, and have raised the salary from £150 to £175 per annum.

St. Andrew Church, Plymouth, has been enriched by a fine peal of carillon bells at a cost of £400. Messrs. Gillett and Bland, of Croydon, are the makers.

The sinking of an experimental well at Egford, for a new water supply for Frome, has resulted in tapping a spring, which appears both copious and of good quality. The works are being carried out under the superintendence of Mr. Tomlinson, C.E., engineer to the urban authority, by Mr. Charles Barnes, the contractor.

The Local Government Board has decided, upon a case referred to them, that Mr. R. G. Smith, late borough surveyor of Kingston-on-Hull, is entitled to compensation at the rate of £60 per annum for loss of office arising from re-arrangement under the local amalgamation scheme.

The members of the Bristol Cymmrodorion Society visited Worle-hill, near Weston-super-Mare, and inspected the British camp thereon. The outlines of the camp were pointed out by Mr. J. F. Nicholls, F.S.A., chief librarian of Bristol free libraries, who also read a paper on the subject.

It has been decided, at a meeting of parishioners of Kensington, to complete the unfinished portion at the east end of St. Mary Abbotts Church, according to the plans of its architect, the late Sir Gilbert Scott, as a memorial of the ministry of Dr. Maclagan, the new Bishop of Lichfield, while minister of the parish; and, further, that a slab of marble or brass be inserted near the chancel setting this forth in suitable words. Dr. Maclagan has promised to place a fresco on the north wall of the church as a thank-offering.

The Dean and Chapter of Llandaff have accepted the tender of Messrs. Mears and Steinbank, of London, for providing seven bells for Llandaff Cathedral. With the large present bell, which will form the tenor of the set, a peal of eight bells will be hung in the tower, and together with a monumental brass in the cathedral, will form a memorial to the late Dean Williams.

A group of buildings at Wrexham, formerly used as the militia depôt, is being converted into a magistrates' court-house, prisoners' cells, &c., in accordance with plans prepared by Mr. R. Lloyd Williams, county surveyor for Denbighshire. The contract has been taken by Mr. Griffiths, and is to be completed by October.

LEGAL INTELLIGENCE.

CONTRACTS *v.* DAYWORK.—Wynn *v.* Roberts.—This case, tried at the North Wales Summer Assizes last week, at Carnarvon, before Lord Justice Bramwell, afforded a remarkable instance of the advisability of employing an architect even in comparatively trifling contracts. The plaintiff, who is a contractor, sought to recover from the defendant, Miss Roberts, a lady, for whom he had done some work. His case was to the effect that the defendant employed him to convert a photographic establishment at Twthill, Carnarvon, into a spirit vaults. The plaintiff said he would do the work for £70. It was suggested that Mr. Thomas, architect, of Carnarvon, should prepare the agreement between the parties. On the 10th March, 1877, the agreement was entered into, the plaintiff agreeing to make the cellaratures to the premises for Miss Roberts according to a plan and specification which he had seen, and to complete the same on or before the 28th May, 1877. Should he fail to complete the work by that time he agreed to owe Miss Roberts 10s. a day for each day on which the work should be incomplete afterwards. The amount of the contract was £70. The plaintiff further agreed to make an additional cellar free of charge, if the job paid him. That agreement was signed by the plaintiff. Afterwards a different and much more formal agreement was prepared by Mr. Thomas and sent over to Mr. Wynn for execution, the defendant bringing it herself. The agreement said the work had to be done for £70, and he, therefore, refused to sign it. It was then agreed that the plaintiff should go on and do the work by daywork. He now sought to charge her what he had paid out of pocket. The amount was £159 6s. 4½d. £25, which had been paid, was deducted, and the amount sought was therefore £134 6s. 4½d. for work actually done under the agreement to be paid by daywork. The defendant swore that she never agreed to pay £170, and that she never authorised the plaintiff to complete the job by daywork. The evidence of Mr. John Thomas, architect and county surveyor for Carnarvon, which practically decided the case, was to the effect that he saw the plaintiff sign a tender for the work. He distinctly read over the tender to the plaintiff before the latter signed it in witness's presence. Before that the plaintiff had seen the plan and specification. A day or two before signing the agreement plaintiff had the original specification and plan in his possession. The original plan and specification did not include a portico, cellar, water-closet, and other things. Plaintiff's original tender to do the work for £82 10s. was not accepted. The specification was afterwards altered to contain portico, water-closet, cellar, &c. £70 was the sum distinctly mentioned by both parties after the specification had been altered. The plaintiff signed the agreement after having it read over to him, and there could not be a doubt as to his understanding that the amount was £70. Witness had occasion to find fault with several portions of the work. The plaintiff did not engage sufficient men, and as the work was proceeding slowly witness reminded him that he was liable under the contract to pay 10s. per day on the days on which the work remained incomplete after the specified date. Witness had been over the work since the plaintiff left off, and he had estimated the value of the work at £61 13s. 10d. Witness made a deduction of £20 for valuable material taken away by the plaintiff, leaving a balance of £61 13s. 10d. Witness calculated that plaintiff had done about three-sevenths of the whole contract. The judge observed that, if what was stated was true, then the plaintiff had no cause for action. He agreed to do the whole of this work for £70, and if he left so much of it undone, adding £20 to that, he had been paid more than £75. The question was whether the jury were ready to disbelieve Mr. Thomas—the question was whether he made a good bargain or an improvident bargain. If he made a bad bargain he must abide by it. There was an end of the case, providing the jury believed Mr. Thomas. The jury returned a verdict for the defendant.

ALLEGED INCOMPLETENESS OF AN ARBITRATOR'S AWARD.—In the Exchequer Division, High Court of Justice, at Dublin, on July 5, the case of James H. Webb and Co., Limited *v.* Samuel H. Bolton, came before the Court on cause shown against a conditional order to set aside an award. Plaintiffs employed defendants to execute certain buildings for them in the Corn-market, Dublin. A dispute having arisen in connection with the way in which the contract was carried out, the parties appointed Mr. James Owen, architect to the Board of Works, to decide the matter between them, and on the 24th of May last Mr. Owen awarded the sum of £448 12s. to the defendant. The award was impeached, on the ground that the arbitrator had not allowed amounts in respect of several heads of expenditure, but had given a lump sum. After hearing arguments on ether side, the Court allowed the cause shown, and affirmed the award to be absolute.

Private Rae, the winner of the Queen's Prize at Wimbledon this year, is a builder, in partnership with his father at Kilsyth, near Glasgow.

PARLIAMENTARY NOTES.

WATER SUPPLY IN SOUTH LONDON.—Sir U. Kay-Shuttleworth last week asked the President of the Local Government Board whether his attention had been called to recent complaints in the South London newspapers on the subject of the insufficient supply given by the Southwark and Vauxhall Water Company in Peckham, Bermondsey, and other parts of its district, and to the accounts of an extensive and destructive fire in Peckham on June 22, when, owing to the short supply of water, the Fire Brigade could not get two steam fire-engines, which arrived shortly after the fire broke out, to work for some time; whether he had caused any remonstrance on the subject to be addressed to the water company; whether the Metropolitan Board of Works had taken any action; and whether, considering the numerous and long-continued complaints from that densely populated district and the repeated cases of insufficiency of supply, the Local Government Board were prepared to encourage an application to them under section 11 of the Metropolis Water Act, 1871, to require the company to provide a constant supply. Mr. Sclater-Booth said his attention had been called generally to the complaints in respect of the water supply in these populous districts of London; but he had only received within the past few months two formal complaints with which it was possible to deal. An inquiry had been made as to the cause of the complaints, and the reasons given were that the short supply of water was due to defective fittings and inadequate accommodation in the houses. As to the fire, there was a delay of half an hour owing to the deficient supply of water, and in answer to the complaint the company stated that the turncock, who lives near where the fire was, was not called upon to give assistance, nor was any complaint made to the office of the company although only a short way off. The hon. member asked whether there could be a constant supply, but this was a matter by no means easy to accomplish. He was, however, perfectly ready to deal with applications if made to him.

POLLUTION OF RIVERS.—In answer to Sir U. Kay-Shuttleworth, Mr. Sclater-Booth said, on Friday last, he could not say exactly how many summary orders requiring offenders to discontinue pollution had been made by County Courts under the Act of 1876, nor in how many cases local authorities had taken proceedings to enforce the Act; but proceedings had been instituted in many districts. In three cases the inspectors had received applications for certificates that all practical means had been adopted to prevent pollution, but these certificates they had refused to give. In eight cases applications had been received for extension of time to do the necessary work, and in three extensions had been granted. He stated the other day that proceedings were being taken under the Act in several counties of such varying characteristics that it might be said the Act was in general operation.

THE ARTISANS' DWELLINGS ACT.—Sir U. Kay-Shuttleworth on Friday week asked the Chief Secretary for Ireland whether he had observed that the committee appointed by the Treasury to inquire into the Board of Works (Ireland) account for the absence of results in Ireland from the Artisans' Dwellings Act, 1875, by saying (Report, p. 11) that it "has not as yet been long enough in opperation to admit of advantage being taken of its provisions to any appreciable extent;" whether, considering that a recent Parliamentary Return (No. 206) showed that much advantage had already been taken of the same Act in England, he could suggest other reasons than that given by the committee for its want of effect in Ireland; and whether he proposed to take any steps to encourage or facilitate a more energetic use of this and other statutes for the improvement of working people's dwellings in Ireland. Mr. J. Lowther: I am not aware what the committee intended to convey by the paragraph in their report to which reference is made, but I fancy the hon. baronet must have placed a construction upon it which it was not calculated to bear, although I confess that I drew a similar inference myself until I ascertained how the case stood. The real facts, however, are that there are in Ireland five towns having a population of upwards of 25,000, within which limit the Act is confined. In England there are 71 and in Scotland six towns to which the Act extends. Out of the five towns in Ireland, three have availed themselves of the Act—namely, Dublin, where upwards of £36,000; Belfast, where £11,000 odd; and Cork, where upwards of £51,000 has been appropriated under the provisions of the Act; whereas in England only nine towns out of the 71 and in Scotland only one out of the six have taken advantage of it. The House will therefore see that Ireland has proportionately availed itself of the Act to a far larger extent than other portions of the United Kingdom. Mr. Cross desired to add that the time had now come when inquiry should be specially made in reference to the towns in England, where an official report had been made and no action taken upon it, why the matter had not been attended to.

Our Office Table.

THE dissatisfaction expressed with regard to the decision announced in connection with the Brompton Oratory competition does not diminish. From what we can gather the Oratory Fathers do not seem to appreciate the grounds of complaint put forward by the competitors and others. Their position, as understood by themselves, is that they announced all along that the competition would be decided by themselves, and that all they engaged to do was to consult a professional architect. They did this without in any way pledging themselves to adopt his views, and we believe they consider themselves solely responsible for the award of the two prizes, and that they are in no way bound or even able to publish Mr. Waterhouse's report, which was marked "Confidential." As a matter of fact, the contents of Mr. Waterhouse's report are known to others besides the Fathers, and it is quite possible that it may yet see the light. The complaint of the competitors and those who endorse their views, is, that it was unfair and ill-advised on the part of the Fathers to invite a competition, to promise to seek professional assistance in deciding the result, and then to award the first prize to a design which, in almost identical though not so elaborate a form, had been submitted to them, and published in our own pages more than two years before.* If the Fathers arranged the competition, already predisposed in favour of Mr. Gribble's design, simply with the idea of seeing whether something more to their minds would turn up, they certainly did not deal fairly with the other competitors. If they had abided by the advice of their referee and published his report, as probably every competitor expected they would, the result would have been satisfactory; at present we cannot say that it is so.

THE committee appointed to carry out the proposed memorial to the late Mr. Edmund Sharpe, M.A., have issued particulars of their scheme, which comprises the publication of a work illustrating the architecture of Charente, from the drawings made from sketches obtained during the last excursion of the Architectural Association, conducted by Mr. Sharpe. Upwards of 200 drawings, geometrical as well as perspective, have been prepared, ready for photo-lithography, and from these it is intended to select from 40 to 60 plates. The committee estimate the cost of preparing and publishing 500 copies at £500, and propose to sell the work at the subscription price of a guinea and a half. This will, of course, cover the outlay, but to secure themselves it is proposed to form a guarantee fund. We hope the work will be heartily taken in hand, but we think the estimate higher than need be, and it would have been better probably to have kept the price of the book at a guinea, publishing a larger number. The work would then have been more within the reach of students, while the original outlay would not have been materially increased. It ought not to be difficult to obtain the names of nearly every member of the Architectural Association in support of such a memorial to the greatest benefactor that society ever had.

* See BUILDING NEWS, March 3, 1876.

THE Council of the Somersetshire Archæological and Natural History Society, who have their headquarters at the Castle, Taunton, have arranged an exhibition in aid of the Castle Purchase Fund of nearly 2,000 line engravings, etchings, mezzo-tints, and aqua-tints, lent by collectors in the district. The exhibition is divided into periods, and the first period represents engravers born before the year 1550, such as Albert Durer, Marc Antonio, and Lucas Van Leyden. In the second period, that extending from 1550 to 1600, are exhibited, among the works of many other artists, examples of the Caracci of Bologna, Goltzius of Germany, Vorsterman and the Bolswerts of the Netherlands. The period from 1600 to 1700 includes the works of Callott, Nanteuil, Edelinck, and the Audrans, and for the first time in the history of the art to that date examples of an English artist, Farthorne, the portrait-engraver, occur. Between 1700 and 1775 the period was exceedingly rich in engravers, and many works by Sharp, Woollett, Sir Robert Strange, and Hogarth are shown, including works after Vandyck, Raphael, and Correggio, by Sir Robert Strange, and a whole series of the mannered caricatures of Hogarth. The engravings by Bartolozzi are in great force. Of Raphael Morghen's engravings, too, in the period succeeding the year 1775, there is a good collection, including "The Transfiguration," after Raphael, lent by the Ven. Archdeacon Browne; "The Madonna," after Andrea del Sarto, by Mr. White; "The Last Supper," after Leonardo da Vinci, by Mr. C. Welman, and many others. There is a well-preserved engraving, too, of Müller's "Madonna di San Sisto," after Raphael. The etchings are especially rich in Rembrandts, and there is, too, a large collection by Della Bella, Waterlo, Salvator Rosa, Castiglione, and Sir Edwin Landseer. The chief attraction among the mezzo-tints are the examples of James M'Ardell, who engraved after Hogarth and Sir Joshua Reynolds, and there are more than 30 engravings by the eminent English portrait-engraver, Reynolds. Contemporary engravers are not so largely represented as might have been expected, but there are some meritorious works after Millais, Doré, and others.

THERE is rather more activity in the timber trade at the various ports recently. The spring fleet has brought a plentiful supply, from which such sorts as are wanted can easily be selected, and this of itself helps to brighten the trade a little, though it cannot be said that there is any large demand or any important improvement on the general position of the trade. At Glasgow, Greenock, &c., there has been a moderate amount of activity. The trade at London and at the other leading English ports has also of late shown rather a better feeling. New imports come to hand, and these attract buyers, who take off special descriptions, for which a somewhat better price is given, so that the sales of the past weeks have been better supported, both as to attendance and competition, than formerly.

THE twenty-seventh annual meeting of the Birkbeck Building Society was held yesterday, July 18th. The report which was presented to the meeting stated that the receipts for the year were £5,418,793, and the total from the commencement of the society £38,835,307. Notwithstanding the general depression of trade, and reduction of interest to 3½ and 2½ per cent., the balances of deposits and investing shares have risen from £2,263,719 to £2,349,488, or an increase of £85,769. The gross profits earned by the society during the year are £107,878, upwards of £1,861 in excess of the previous year. Of this amount £91,196 has been appropriated to the payment of interest on shares and deposits, discount, and expenses of management, leaving a net balance on the year's working of £16,682. The surplus funds amounted last year to £1,746,488, of which £1,575,706 was invested in Government, Indian, and Metropolitan Stocks, City of London and Colonial Bonds, gas and water stocks and shares, freehold ground rents, and other readily convertible securities, and £170,742 remained at call in the hands of the bankers. At the present time the amount invested in convertible securities is £1,664,512, being an increase of £88,806, while the sum of £184,525 stands to the credit of the society at the bankers, being £13,783 more than last year. The total increase of the surplus funds is £102,589. The proportion of reserve to liabilities is now upwards of 78 per cent. The total liabilities of the society are £2,349,488, and the assets £2,446,902, showing a net surplus of £97,413. Of this sum £33,750 is invested in Consols as a permanent guarantee fund, leaving £63,663 to be carried forwa rd. The number of investors and depositors at the close of the year was 39,276, while the shares in existence number 33,305, on which £151,508 has been paid up.

FUNDS are being collected for the preservation of the fine church of St. Peter, Mancroft, Norwich. The following paragraph in last week's *Athenæum*, in connection with the matter, is complimentary to the profession, and will help its members to estimate at their true worth the noisy school of anti-restorationists, and those who support them: "While we advocate maintenance of this fine architectural and historical building, it is necessary to protest against the employment of an architect in this as in similar cases, because an architect's professional instincts, not less than his personal interests may—at least, so long as the 'five per cent.' practice obtains—lead him to do that which cannot by any possibility be done without destruction of all that is valuable to the future—all that Norwich men ought to preserve and venerate in St. Peter's. If preservation and due maintenance of what time has honoured, if to retain all that history prizes in Mancroft Church be really the desire of the vicar and churchwardens, let them employ an

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N.B.—DIAGRAMS AND PROSPECTUSES ON APPLICATION.

engineer, who can do all that is wanted, and probably at one quarter of the cost of what the architect would charge."

THE success—commercially and constructively—of the Tay Bridge has given notable impetus to the other great enterprise which is required to complete the Scottisa and East Coast railway system. Mr. Bouch's design for a Forth bridge has been for some time in abeyance; but in the recent passing of an Act of Parliament, which empowers four great railway companies to guarantee the undertaking a revenue of £75,000 a year, it has taken a fresh start, with every prospect of speedy accomplishment. As originally designed, the great spans were to be placed at the height of 150ft. above high-water mark, so as to admit of the free passage of her Majesty's ships of war to the anchorage of St. Margaret's Hope. Such a height being now superfluous, the promoters ask leave to cut it down to 135ft.—an alteration which, by enabling them to shorten their piers all over the structure, would ensure a very considerable saving in the cost of material. Dealing with an estuary whose depth precluded the possibility of founding piers in its bottom, Mr. Bouch was obliged to adopt an entirely different principle from that so successfully carried out on the Firth of Tay. Taking advantage of the island of Inchgarvie, about midway between North and South Queensferry, he conceived the bold idea of a suspension bridge in two enormous spans. From the high ground overlooking either shore to the edge of the deep water, the railway will be carried on a series of light-looking spans, supported on cylindrical brick columns, and somewhat resembling in their general appearance the northern section of the Tay Bridge. Where the bottom begins to shelve downwards there will be placed at each side of the Firth a lofty composite pier, consisting of four sets of iron columns resting on substantial basements, and securely braced together. Immense chains, duly anchored at points some distance landward, will be carried over the tops of these piers, and of two similar piers to be planted on Inchgarvie; and from these will be suspended the two lattice girder spans, each about 1,600ft. in length, by which the deep-water channels are to be crossed. In carrying out the work the first operation will be to construct the piers and get the chains into position. The spans will be built ashore, in lengths of 150ft.; and these, being separately floated out, will be successively raised to the proper height and hung on to the chains, their relative positions being so nicely adjusted that they can afterwards, without difficulty, be worked together into continuous girders.

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CHIPS.

The fourth new school erected by the Aston School Board was opened on Monday. The schools are situate in Burlington-street, and will accommodate 900 children. The building is of red brick, with stone dressings, and has a tiled roof. The schools, which are of Gothic design, have been erected by Messrs. Horsley Brothers, whose contract amounted to close upon £9,000. Mr. G. F. Hawkes, 19, Temple-street, Birmingham, was the architect.

The Burial Board for Thirsk, Yorks, at a recent meeting appointed Mr. Wm. Bell, architect and surveyor, of Thirsk and North Allerton, as their architect, and was instructed to prepare an approximate estimate of the cost of building the chapels, entrance lodge, walk, &c. Mr. Henry Smith, solicitor, of Thirsk, was appointed the clerk to the board. The site is still undecided upon.

On Thursday week last a new chapel, in Frodsham, in connection with the Primitive Methodists, was opened. The building, which is of brick, is 40ft. long, 32ft. wide, 16ft. high to the foot of the rafters, and about 24ft. to the ceiling, and will seat 200 people. The plans were prepared, gratuitously, by Mr. C. E. Linaker, of Frodsham—Mr. T. Davies, of the same place, being the contractor.

Two new board schools for the Durham School Board have been erected at Ferryhill and Chilton. The first accommodates 400 children, and the second 600, the cost of the two being £5,300. The buildings are of brick. The designs were prepared by Mr. William Fox, architect, Durham. The sole contractors were Messrs. Hurst and White, of Langley Moor.

The Town Council of Dorchester recently determined to proceed with the necessary steps for obtaining an improved water supply in accordance with specifications prepared by Mr. Norman, borough surveyor—a counter proposition to request Messrs. Gotto and Besley, of Westminster, who have reported to the council on the subject, to undertake the work, falling through.

A new brewery has been erected at Loughborough under the direction of Mr. W. W. Popplewell, architect, of Derby.

The Fine Arts Jury of the Paris Exhibition has awarded the ten grand medals of honour for painting as follows:—To Messrs. Millais and Herkomer, representing England; to MM. Meissonnier, Cabanel, Gerome, Français, and Bouguereau, French painters; and to M. Munckacksy, Hungary; M. Mackart, Austria; and M. Wauters, Belgium.

Mr. J. B. Nelson, a large railway contractor of York and London, died at Dublin the other day of congestion on the brain. At the time of his death Mr. Nelson was carrying out important contracts at Wolverton, near Rugby, and Stockton-on-Tees, for the London and North Western, and the North Eastern railway companies.

The River Tyne Commissioners have accepted the tender of Messrs. W. and J. R. Freeman, granite merchants, of London and Penryn, for the supply of the whole of the granite ashlar required for the works of the Coble Dene Dock. Messrs. Freeman's tender (£16,500) was £600 below any other received by the commission.

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Patent Ventilator or Air-Propeller, for the introduction of Cold or Warm Air into Dwellings, &c.
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Trade News.

WAGES MOVEMENT.

CRIEFF.—The Crieff joiners have continued working at a reduction of their wages from 7d. to 6½d. per hour.

PERTH.—The Perth masons have agreed to work at a reduction of ½d. per hour, the wages at present being 7½d. and 8d. per hour. A strike against this reduction took place about two months ago, but it has now been submitted to without dispute, there being a good many men idle.

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The fasteners are brass or copper. The peculiar arrangement of the glass covers the whole of the woodwork, and only the small fastener is visible; therefore the roof is indestructible, and outside painting unnecessary. The squares of glass can be easily removed, and the whole taken out and cleaned by any inexperienced person. Breakage is impossible except through carelessness or accident.
The glazing is more air-tight than the old putty system, yet any amount of ventilation can be given.
Old roofs may be re-glazed on this principle, and roofs are covered with slates or zinc on this system.
Extract from BUILDING NEWS: "Mr. T. W. Helliwell, of Brighouse, has recently patented and introduced a new system of glazing and covering roofs, which is certainly superior to anything of the kind we have seen before . . . . and it will, in our opinion, supersede any other system before the public."
Important references and all particulars from the patentee, T. W. HELLIWELL, Brighouse, Yorkshire; and 19, Parliament-street, London.—[ADVT.]

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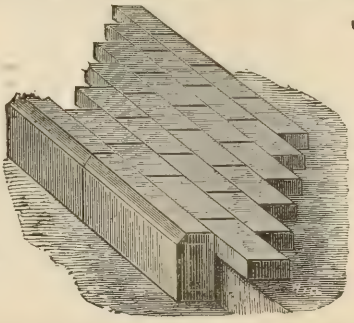

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THE BUILDING NEWS.

LONDON, FRIDAY, JULY 26, 1878.

CYPRUS—CRETE—RHODES: THEIR MONUMENTS.

A NEW interest attaches to the monumental history of these islands in consequence of recent events, which have revived their memories in Europe. In Cyprus itself there are no very important remains, so completely has the work of ruin been carried out by its modern rulers, but the very names upon the map suggest that it was once a country of temples and palaces, built, for the most part, in marble, though belonging rather to the Phœnician than to the pure Greek architecture. Independently of this the Cyprian cities possessed a wealth and a splendour of their own, combining the characteristics of the East with those of the South, and it is upon record how the timber of Olympus was exported to assist in building the mansions of princes in Egypt. However, the early worship of the island was devoted to the goddess Astarte, whose worshippers did not require, as a shrine of their faith, anything better than a rude conical stone. It is different with Crete, which has had a greater number of historians, though their accounts are always inextricably confused with tradition. Its principal monument, however, has had its very existence denied by historians, as has been the case with most labyrinths renowned in poetry. The definition of a labyrinth is agreed to be a large and complicated subterraneous cavern, with numerous and intricate passages, similar to those of a mine. The greatest example is the Egyptian, concerning which no doubt exists. It contained three thousand chambers, divided into courts, was surrounded by a wall, with colonnades of white marble, and was supposed to be a symbolical representation of the zodiacal system, though answering the purpose of a burial-place for kings and crocodiles. The Cretan labyrinth, however, though much more famous, is much more mythical, and many antiquarians have ceased to believe in its existence at any time, any more than in those of Lemnos, Samos, or Etruria, which many travellers have described, and no traveller, ancient or modern, ever saw. In these Mediterranean islands, however, we have not to look so far back for illustrations of an art and a genius which at one period unquestionably flourished in them. In Crete especially, the Sicily of the Mediterranean East, Achaian and Dorian relics of the utmost beauty, as suggested by their fragments, abound; it was called, indeed, the Island of the Hundred Cities, so exuberant was the architecture that fringed and brightened the sea along its shores; but these were not all, or even for the most part, religious or decorative monuments. They consisted largely of immense cisterns, excavated in the solid rock; basins, constructed as adjuncts to harbours; aqueducts cut out of the mountains, and carrying water along their flanks; and innumerable buildings erected in solid stone from quarries which, in all likelihood, originally suggested the idea of the fabulous labyrinth. Of such materials was constructed Gortona, at one time heir to all the Grecian arts; but even more singular were the valley fortresses reared by the islanders of the earlier epochs. These were composed, as in Cyprus, of Cyclopean blocks, carefully squared, and put together without mortar or cement of any kind; but of structures belonging to a nobler class, as, for example, the Homeric Kydonia, no vestiges survive. The Turks have burned every bit of that marble antiquity in their lime-stone furnaces. The monuments which they could not destroy are the rock shrines, hollowed through the solid stone like the Elephantan temples, though neither extensive nor sculptured, although in one spot have been marked the traces attributed to various Roman emperors in a controversy which has not yet come to an end. The most certain information, indeed, that has come down to us respecting the monumental remains in these islands relates to their aqueducts. Their towns, generally planted on natural elevations, were, as a result, commonly deficient in their water supply. The rivers in the valleys were too far off to make up for the deficiency, and moreover were in the summer season frequently scorched to dryness. After, again, a city had become wealthy and populous, cisterns, however capacious, no longer sufficed for its demands. The inhabitants found themselves afraid to drink, and still more to bathe; for, when the hot weather set in, Cyprus, Crete, and Rhodes alike were unable to foretell another fall of rain. Their fountains were parched up to nothing; their women came home with empty amphoræ. They consequently pierced the solid hills for sources, drove large tunnels through them, made semi-scientific guesses at wells situated miles distant from the original point of penetration, and, under the weight of this necessity, erected a marvellous system of water-carrying works. Reservoirs even were hollowed out in the heart of the mountain, and from these the villages of the present day derive the sustenance which, ages since, sufficed for the wants of magnificent cities. But the people of the three islands, like the Greeks, from whom they took their birth, desired that their works should be beautiful, not less than useful. Therefore, the Cretans, whom the Cypriotes imitated, designed a fountain, fragments of which exist to this day, an approach through a grotto, statues of nymphs to guard it, a niche and the image of a protecting goddess, an elegant façade, and, in many instances, the crude rock encrusted with a coating of marble. It is so everywhere—amid the Hellenic remains of Selino, the primitive relics, all classic in their style, of Temenia, the superb Tyrinthian walls, and the Doric ruins of Elenos—each a page of Greek and architectural history, hitherto not fully deciphered.

With respect to Crete, however, the monument it claims from fable is, as we have hinted, undoubtedly no work of art, but a quarry upon an extensive scale, executed upon no plan whatever, though the celebrated travellers, Belon and Pococke, thought otherwise. In point of fact, it has no more existence, in justification of its legendary character, than the Catacombs of Paris or of Rome. The entrance, now, is almost completely blocked up, and a visitor has to crawl for at least forty yards upon his hands and feet, after which he has to advance, painfully, with bended back and knees. Then countless galleries radiate before him, the roofs of all supported by square stone columns, eaten away, however, on their surfaces and edges, by water and vermin. And in these depths occur the peculiarities which have suggested difficulties to the antiquarian criticism of Europe. There are attempts at artistic manipulation, exactly similar to some which have been noted upon the older upper ground monuments, slight though they are in Cyprus, but connecting the earliest annals of the islands incontestably. Moreover, a marble gate, entirely distinct from the stone around it, has been discovered, terminating one of the galleries, with, in near proximity to it, numerous specimens of bronze and jasper-work, and domestic utensils. The labyrinth, therefore, may in itself have been a legendary ideal; but that, at different periods, the quarries were employed for other than industrial purposes, appears not capable of denial. Unfortunately the ruins above ground afford no more than an imperfect key to the ruins below—the temples of Ida are mouldered out of sight, the Lacedemonian Lyctus has scarcely left the fragment of a pillar with which to commemorate itself, and of Therapytua nothing is left beyond a few grape-covered walls, and similar ravage has been marked in Cyprus, concerning which the most distinguished explorer of his day declared, "Its antiquities alone render it worthy of resort; in this pursuit Cyprus may be considered to be as yet untrodden." As it was then so it is now, notwithstanding that a few inscribed tablets were removed from Baffo by Sir Sidney Smith. Of two, one was an epitaph, in Greek hexameter and pentameter lines, the other commemorating public benefits conferred upon the community by one of the Ptolemies. But the Phœnician relics in the island are the most interesting, and have been the most persistently neglected. The inhabitants of the larger towns, indeed, rarely show any anxiety to dig in their own neighbourhoods for discovery's sake, though they seldom do so without bringing to light antique lachrymatories, lamps, and sepulchres, foundations of ancient buildings, and even idols belonging to the most primitive mythologies of the heathen world, dating from long before the conquest of Cyprus by the Ptolemies, and Phœnician in the earliest sense attributable to that archæology. They are in terra cotta, and a careful study of them dissipates the vulgar idea that Venus, and not Ceres, was the adopted goddess of the island—that is, if we may trust such evidence as engraved gems, medals, marbles, and images, which are, indeed, the authentic and original records of the country and its people. Upon almost all the intaglios, the highest authority assures us, found in Cyprus, even among the ruins of Paphos, the representations are either those of Ceres herself, or of symbols designating her different modifications. Intagliated scarabæi, too, have been discovered, with stone coffins of an oblong rectangular form, each being, with the exception of its cover, monolithic, though some contained small vases of unglazed terra cotta, rings, and jewels. One of these last, found several years ago, was a beautiful intaglio, representing Cupid whipping a butterfly, typifying the power of love over the soul, but demonstrating, above all, how purely the art, civilisation, and mythological imagination of the people were Greek.

It is as well, perhaps, to get at the parentage of our future subjects, if the descendants of any among their originals preserve the traditions of their ancestry. Signet rings, moreover, have been found in Cyprus, with Jewish, Egyptian, Roman, and Arabic inscriptions upon them, in plain onyx, and in stones set in gold, sometimes engraven with figures of animals—insects especially—at other times with portraits of women and men, an art practised previously, however, to the engraving of the cameo, which was not known before the Roman age, unless we class under that head that ill-wrought relic known to antiquarians as the Theban stone. However, the Cyprus signets were famous in their day, and were executed in red garnet, or carbuncle, bloodstone, jasper, and even quartz, but the examples of them, absolutely identified as to place and date, are not frequent. Still less are the traces of the ruined cities. Fragments of colossal marble statues have been found, but very little architecture older than the Arabic period. The relics of Citium, indeed, appear, in the sight of modern criticism, very shadowy indeed. If we turn to Rhodes, celebrated though it be

in both fable and history, we perceive the work of dilapidation, so far as antiquity is concerned, to have amounted to obliteration almost. It is true that many of the Saracenic forms of art, introduced into the island at an unhappy epoch, are more or less preserved or imitated, but these are the simplest modernising and corrupt copies from a corrupted style—a mingling of Arabic and Gothic, without the real character of either. Upon the whole, the monumental treasures of these Mediterranean islands have been far worse maltreated than those upon the continent, for the reasons, it may be supposed, that, the space being small, the crowding of strangers was greater, and that there was less likely to escape the iconoclastic eye. But we may be sure that, more than in Rhodes or in Crete, Cyprus contains a world of hidden wealth belonging to the past, in some of its most interesting periods, which the explorers of a few years hence may bring to the surface. We may not, in Rhodes, identify the foot-impresses of the Colossus, which took rank among the wonders of the world; or, in Crete, the traces of the Labyrinth, which took rank as another, but in their sister island, Cyprus, there is a long and varied history, which tells itself in its relics and monuments.

THE DECORATION OF ST. PAUL'S.

ANOTHER chapter in the history of the proposals to decorate St. Paul's is opened, but we sincerely trust not closed. The Dean and Chapter have resolved to carry out an experimental portion of the scheme of the sub-committee, reported at length in our last number, and have given their sanction in part to a proposal for the mosaic decoration of the dome of the cathedral in facsimile, at a cost of about £4,000. In the abstract we have little to say against the proposal; the idea of decorating the dome with mosaic is in accord with the notion of Wren himself; but the question is whether the suggestion made to treat only this portion of the cathedral is entitled to public support. It may be mentioned that Wren contemplated other works than the mosaic embellishment of the dome. The ornamental features at the east end were originally only intended to be temporary till the funds could be obtained for the completion of a magnificent altar, which he had designed. The domical compartments of the vault, and many of the details of the choir and nave, have been left plain for decorative purposes, and certainly call for attention first. But to examine the sub-committee's report. The model left by the late Mr. Stevens, showing a more or less wrought-out scheme of mosaic decoration for the dome, has been purchased by the Dean and Chapter as the basis of what they intend to do, though we question whether their intentions do not virtually amount to a new design. Mr. Stevens's design is no doubt a masterly work in the style, and we cannot object to the acquisition of a model pronounced by all competent artists to be a masterpiece of architectural decoration. The proposed appointment of Messrs. Leighton and Poynter to carry out Mr. Stevens's design is also a happy one, as those artists have probably more sympathy for the style and character of this species of decoration than any others that might have been named. As we stated last week, the scheme contemplated by the committee is virtually that proposed by Mr. Oldfield in his recent pamphlet, and reviewed by us in the BUILDING NEWS of December 26th, 1876. Mr. Oldfield is a member of the executive committee, and went to Italy to study the decorative works of churches resembling St. Paul's. The results of that gentleman's visit were, that the decoration of St. Paul's cupola should be in accordance with the works of the 15th and 16th centuries; that Rome, Florence, Milan, and Genoa furnish the best models; that the pictorial motive found in many of the sacred historical frescoes should be subordinated to the architectural and more mechanical modes of treatment, and that the mosaic decoration of the cupola of St. Peter's affords the best example for imitation. Great stress was laid by Mr. Oldfield upon the idea that Wren intended first of all to decorate the dome. That gentleman also gave his reasons for selecting the cupola. He says it is the dominant and characteristic feature of St. Paul's—it surmounts a portion of the building that has of late years acquired new points of religious interest, and it is a part that may be undertaken without exciting the theological feelings of any party in the Church. As the committee have indorsed these views, it may be as well to say, with reference to the first point, that Wren's intentions were by no means confined to the dome, and that though a dominant feature in the cathedral, it is one of subordinate importance regarded with reference to the other more urgent architectural works required in the body of the edifice. We are surprised to find the report defers the decoration of the drum above the Whispering Gallery till after the dome has been treated, because, we are informed, Wren left no record of his intentions respecting it—a singular reason for omitting it from the scheme. But, however much we may approve of the general design left by Mr. Stevens, it is certainly open to question whether a conception for a fractional part of the cathedral—such as the dome—can be fairly realised before the lower parts of the structure have been considered. It is decidedly not a methodical or satisfactory way of dealing with a vast and elaborate building like St. Paul's to begin with the dome and work downwards. The plan is not free from objections, and may be compared to that of a composition or picture in which the artist had elaborated a certain figure or feature before he had drawn the main outlines of his work, or had conceived a general scheme of colour. It seems to be inverting the real order of procedure. But the most obvious objection to the proposal is that a piecemeal treatment must necessarily lose sight of the scale of parts required to perfect a grand and harmonious interior. A relation between the parts cannot possibly be maintained by the fragmentary mode of decoration contemplated. By selecting the cupola as the starting point of decoration the scale of colour and gradation for the whole of the lower part of the interior will have to be determined by it, and, moreover, the cupola (after all a mere fraction of the whole building) will become the key for the colouring and design. We cannot think this course a judicious one, nor can the practice be sanctioned by that of any great example of mosaic decoration, like that, for instance, of St. Peter's. All the great churches visited by Mr. Oldfield were instances of a complete and harmonious ornamentation. Della Porta, in the decoration of the basilica of St. Peter's, elaborated an entire scheme that was eventually carried out by Paul V., Bernini, and his successor; and the other examples brought forward of cinque-cento ornamentation were equally the results of a co-ordinated study of colour and design. If we refer to the earlier semi-Byzantine mosaics in the Ravenna churches we observe, not fragments, but complete studies.

Many of the greatest painters have erred in representing what should be conceived and painted in a grand style in a miniature and over-elaborated form, and even the tentative means to be resorted to in fixing large cartoons of the figure-subjects in the spaces cannot be implicitly relied upon in giving that relative prominence to each figure, and that true lineal and aërial perspective so essential to a harmonious decoration of a great building. The report, too, is not definite in its recommendations as to the domical subjects. Eight great circles are suggested to be filled with cartoons by Mr. Leighton, at a sum of £600 for each circle, and Mr. Poynter has agreed to furnish cartoons for the other figure-subjects of Mr. Stevens's design at an aggregate cost of £11,480. The report speaks with much hesitation as to these smaller subjects; the telamones at the base of the ribs are regarded as doubtful in effect, and the committee have not made up their minds what other kind of conventional architectural design can be substituted for them. A certain saving in the omission of these and other figure-subjects is suggested, but it appears to us that this uncertainty is prejudicial, and from the report it is clear that the effect of the recommendations will be to spend from £18,000 to £20,000 on a number of experimental cartoons—after all merely tentative and liable to considerable alteration before any real decoration is effected. We are, in fact, to spend this sum in trials of full-sized cartoons, coloured and gilt in imitation of real mosaic tesseræ, and placed *in situ* before any real advance is made. Of course, we do not object to the means if the design were sufficiently elaborated, but the artists engaged have obviously not settled upon what they intend doing, and from all it appears that Mr. Stevens's design will be widely altered, if, indeed, it will not be mutilated. Another point which has not received, perhaps, the full consideration it demands is the division of the dome into compartments by ribs. Some contend, and not without a just conception of the decorative treatment of the inner dome, that ribs express a character out of keeping with its real structure; that the decorative dome is a mere internal shell, and should be treated accordingly. We do not share this opinion, inasmuch as the pilasters of the drum seem to warrant a continuation of those features; but to decorate the spherical surface, and not the drum itself, is certainly an imperfect mode of dealing with it. The base of the visible dome should be the first step towards a satisfactory solution of the problem, as the coloured masses above would appear heavy and meaningless resting upon a plain base. We fear the omission would destroy the balance of parts. An excellent authority on mosaic decorations has said that legitimate decoration in this material should, in the first place, be made subservient to the architecture; it should be simple in its design, and not aim at subtle gradations of colour and perspective. Whatever is attempted, no greater mistake could be made than to produce a fine picture suspended in the air—such, for instance, as one of Rizzi's designs in enamel mosaic at St. Mark's. We are not told in the report anything about the mosaic, what style is to be selected, or what models are to be followed—whether St. Mark's or the basilicas of Ravenna are to suggest the treatment, or the later works of the sixteenth century. Into the details, however, we refrain from entering; we only think it a mistake to expend a large sum upon experimental cartoons for the decoration of a mere fragment, as proposed by the committee, when so much has yet to be done to render the cathedral worthy of the nation and the metropolis in other respects. We do not find fault with the *modus operandi*; no one can object to the employment of mosaic as the most fitting and durable form of mural decoration, nor could the committee have placed the task of translating the full-size cartoons of the artists into mosaic form into better hands than those of Mr. Hugh Stannus, a former pupil of Mr. Stevens, and a gentleman well qualified to interpret the design in

a right spirit. As regards the execution of the mosaic, the estimates obtained by the committee from the Murano Glass Company, and Messrs. Powell, of Whitefriars, are not unreasonable; the price given by the latter firm is from 30s. to 35s. per foot. The area of domical surface has been calculated by Mr. Penrose at 16,000 square feet, which at the last-named price would cost £28,000.

Another question, though not the least, refers to the subjects. The suggestion of Mr. Oldfield, that the subjects should be from the Apocalypse, has been agreed to by the committee. We have some hesitation in supporting this idea upon artistic grounds, though the dome is unquestionably a more appropriate location for a grand symbolic conception than any other portion of a church. Such a theme can be broadly handled, and be made to assist the architectural features better than simple narrative and pictorial scenes; yet we have one difficulty—that of selecting a design worthy of St. Paul's. The visions to be selected for the dome are not stated in the committee's report, and we are left in much obscurity respecting the actual designs proposed. From a memorandum, however, on the subjects for the dome, drawn up by Mr. Oldfield, we gather the general arrangement of the subjects contemplated. Mr. Stevens's design shows eight compartments, separated by decorative piles, of figures or ribs. At the base of dome are colossal figures seated on thrones. Above are shown eight groups in large circles, and a third range of smaller circles above this are occupied by other groups. Thus three series of figure-subjects are sketched in Mr. Stevens's model, and the sub-committee suggest Mr. Oldfield's third memorandum or scheme on both theological and artistic grounds, which nearly conform with this arrangement. In the amended arrangement, the whole dome is divided into two parallel series of groups. The upper series comprises eight small circles, representing symbolic figures of Our Lord or the Holy Spirit; while the lower series has eight large circles or groups, in which no divine person appears, but belong to the "earth, and its hours of darkness and delay." The Biblical order has been preserved in each series horizontally, and a connection is also maintained vertically. Thus the Last Judgment is represented in the upper and lower series in the eastern compartment of the dome—the upper subject being taken from Rev. xx., 11, Christ on the White Throne; while in the lower circle we have "The dead, small and great, rising to judgment." In the first memorandum the drum is incidentally referred to. Mr. Oldfield thinks that Sir C. Wren intended this space to be flat and unbroken, and not divided into parts; and he suggests thirty-two figures, illustrative of New Testament men and women, under the thirty-two windows or niched piers. As regards the eight pendentives under the Whispering Gallery, it is proposed to fill them with colossal mosaic figures in continuation of the scheme of Messrs. Watts and Stevens, and that not till this is decided upon is the drum to be considered.

In conclusion, we hope the Dean and Chapter will pause before committing themselves to a scheme that must be admitted to be incomplete and fragmentary, and we would suggest that, before the experiment on one section of the dome is tried, a more satisfactory proposal should be brought before the public. We would ask whether the subscribed funds would not be better employed in perfecting the unfinished portions of our great metropolitan church, in remodelling the choir, and in relieving the present bare and unsatisfactory appearance of the domical area. We have before strongly urged the adoption of Mr. Street's suggestion for the erection of a second altar, with a baldacchino under the dome—the only feature that can give a motive and purpose to so large an area. Such an occupation of the space must commend itself to every one capable of forming an opinion; while the funds would be spent in gradually utilising the area, in the adornment of the noblest part of the cathedral, and in furthering that more comprehensive scheme of decoration intended by Wren and his successors.

PARISIAN ARCHITECTURE AT THE PARIS EXHIBITION.

AN interesting collection of models and drawings, illustrating the chief architectural works contemplated or in progress in Paris, is arranged in the southern court of the gaily-decorated pavilion of the Town of Paris, and located in the very centre of the Universal Exhibition. The buildings exemplified are almost without exception of a public character—a town hall, local authorities' offices, markets, theatres, barracks, churches, and schools being almost the only classes of exhibits. The nearly entire absence of domestic and minor works considerably detracts from the practical value of the display.

A large show is made of models executed in plaster of Paris, and occasionally coloured; these generally illustrate the completed structure or its section. Neither in these nor in the drawings are the "details" of construction or ornamentation shown to a large scale, and in estimating the merits of a design in this "Exposition de la Ville de Paris" one is frequently irritated by the omission of a scale, and of indication of the orientation.

Broadly regarded, the buildings are generally conceived in what may be characterised as a Vernacular Renaissance—a Classicism free from the eccentricities which individualise and occasionally disfigure the corresponding Jacobianisms of our own architects. Ornamentation is applied without stint upon the leading lines, and the accessories of statuary and colour (both in fresco and stained glass) are largely employed to give life and light to the conception. There are very few examples of Gothic treatment (except of the earliest type) in the pavilion, even restorations being dealt with in the fashionable mode—horizontality stamps the style alike for a church or for a railway station, and there is therefore somewhat of sameness in the exhibits. The plans are chiefly based on the central court-yard idea, the designer's skill being displayed in the manner in which the surrounding buildings can be grouped around this open area with economy in corridors and in walls. In scarcely any case is the perspective effect of the edifice sought to be shown, nearly all the drawings being geometrical in character. The materials proposed for use are usually concrete rubble for internal work, with or without an iron skeleton, and for facings the fine buff-coloured limestone quarried from the immediate vicinity of Paris. Bricks are rarely employed, and then only for filling-in.

Passing from generalities, the most important work exemplified in this architectural display is undoubtedly that of the Hôtel de Ville, now in course of rebuilding from the designs of Messrs. Ballu and Deperthes, joint architects, a work illustrated by a very elaborate series of models, plans, and elevations. Considerable progress has been made in this re-erection; only a very few fragmentary internal walls remind one of the too-successful labours of the petroleuses in May, 1871. The entire site is covered, after the manner of Paris, with gigantic and substantial scaffolding and lattice-work, and the Rue de Rivoli front of the new edifice has risen to the mezzanine stage above the main floor. The Hôtel de Ville occupies an isolated quadrangular site, the actual space to be covered by buildings being a rectangular area 141·78m. by 80·84 metres (464ft. by 265ft.), including that reserved for two open courts. The plan of the principal floor shows a grand vestibule in the centre, approached from the Place de l'Hôtel de Ville by a double flight of steps, and opening directly into the chief apartment, the hall of the municipal council. At the rear of this is a small court (Louis XIV.), leading into a long room (Salle de St. Jean), and on the left, facing the Rue de Rivoli, a similar oblong apartment (Salle de République), with kitchens, serving rooms, &c., attached. Throughout the several floors the rooms to left of grand vestibule are reserved for bureaux, and those on right for the Préfet, but the plans are "skied" too far to allow of the close study they deserve. The elevations show that the frontages are well broken up by slightly recessing portions, thus bringing forward the centres and end wings. The chief façade is treated in two orders set upon a high basement, and with loftily-pitched roofs marked at the angles by pavilions and Mansard towers, and finished with elaborate ridges. Niches are provided for statues, and the columns dividing the windows of the recessed portions of this front are to be terminated with sculptured figures. Over the central entrance is a pediment to be filled by an emblematical group, beneath being the inscription, "1533 · Hôtel de Ville · 1878." Behind this a lofty flèche rises from the centre of roof. Square at juncture, the angles of this tower are canted off in next stage, and this octagon supports a circle of columns forming a belfry; above this is a gallery, the whole being crowned by an ogee turret and vane, at a height of 51·36m. (168ft.) above the datum level. Both the courtyards are splayed off at the inner angle for an external circular staircase, which will be raking, as in the château at Blois, and will form a striking feature of these internal spaces. The side fronts to the Rue de Rivoli and the Seine will be kept comparatively low, the spaces between the columns and the roof being glazed. The former façade seems to us scarcely dignified enough for the street and the edifice. There is sufficient repetition in the treatment of the several fronts to give homogeneity and character to the building, and though there are many details the propriety of which one might question, bordering, as they do, on the rococoesque, the new or rather reconstructed town hall will be worthy of the city of Paris, and a monument reflecting credit on Messrs. Ballu and Deperthes.

The local authorities of Paris are being provided, especially in the more recently-added districts, with fine and substantial buildings ("mairies") for the transaction of business relating to their arrondissements. That for the XIth arrondissement (Popincourt), M. Gancel, architect, is built around a square courtyard, entered by archway; above the principal roof is a turret, and the whole arrangement is very simple. The mairie for arrondissement XIII. (des Gobelins), M. Bonnet, architect, has greater pretensions to originality, but the planning is uneconomical, and too much cut up by passages; that for the arrondissement XV., in the Rue de Vaugirard, designed by M. Devroy, also illustrated by model and elevations, is ingeniously contrived to utilise space, being LJ-shaped with central entrance. One of the largest models in this pavilion is that of the abattoirs and cattle-markets in the suburb of La Villette, planned by M. Janvier in conjunction with M. Baltard; the sheds have iron roofs and stone sides with louvres for ventilation, and arranged in parallel rooms with avenues between sufficiently wide to allow of the easy turning of an animal. The Marché des Martyrs has been built by MM. Arnoult and Guiborge, fils,

of Paris, from the designs of M. Magne, M. L. Magne superintending the work of erection, and is treated in a Romanesque spirit. The interior is divided into nave of five bays by cast-iron columns behind up-run aisle-passages. The roof is of wide span and of iron, cleverly and lightly trussed with substantial diagonal pieces and slender tie-rods and uprights. Light is obtained from the north, and ventilation by louvres; the ends of the building are glazed with ground glass with blue and ruby red borders. The walls are of good thickness, of concrete faced with ashlar. The interior of the market, which is reached by double flights of no fewer than 20 steps at each end, is laid out in rectangular spaces, much as in the new Metropolitan Meat Market at Smithfield. Between the columns are arches turned in stone, supporting the groining of roof. Beneath the market are vaults slightly below the street level.

Important extensions are about to be made at the rear of l'Ecole de Médécine so as to face the recently-cleared Boulevard St. Germain. A single order of Ionic columns will be set upon a lofty, rusticated base, the intercolumnar space being pierced by plain, oblong, heavily-transomed windows, lighting a principal floor to be used as a lecture-hall, and a smaller one above. By this simple means the architect (M. Ginain) has given a bold façade to the school buildings, and one quite in keeping with the old frontage.

Church architecture is well represented on the walls both in restorations and new buildings. M. Vaudremer sends drawings of his restorations of St. Germain l'Auxerrois, including some measured drawings. The church of Nôtre Dame de la Croix, recently built from M. Hèret's designs, is a spacious Middle Gothic edifice, with substantial western tower and spire, having a lofty nave of six bays, choir in three bays, transepts, and a triapsidal east end of three semicircular chapels; the plan is compact, and although the treatment is studiously plain, the internal effect of the grouping of chapels and aisles is imposing. In a very different style is the Church of St. Augustin, near the Western of France terminus—an iron-roofed florid Renaissance building with a superfluity of carving and colour, completed a few years since from the designs of M. Baultard. Notre Dame d'Auteuil has been designed by M. Vaudremer. It is a basilical edifice, with heavy-vaulted roof of wide span, and broad shallow transepts. The west front is spoiled by a slender circular turret, suggestive in outline of a bodkin, and finished by a heavy iron cross. One of the most remarkable series of drawings is that illustrative of the Church of the Sacred Heart, the foundations of which fabric have just been completed on the heights of Montmartre. The style is Lombardian. At the crossing is to be a large dome, flanked by four smaller ones, and at the east end is an equally lofty campanile, all these features and the angle turrets being roofed with cone scales in stone. The external materials are stone and marble disposed in broad bands. At the angles of the west portico are to be erected equestrian statues in bronze. The architect of this remarkable structure, which is estimated to cost upwards of three-quarters of a million sterling, is M. Abadie. The church of St. Joseph (M. Ballu, architect) is a Romanesque building of considerable importance, with nave and choir each of five bays, transepts, and an eastern chevet of chapels. A free use is proposed to be made of engrailled and stained glass. The general treatment appears, in the model, flat and somewhat mechanical. The same architect also sends designs for the Church of the Trinity, a basilical structure with detached campanile.

An interesting group of drawings is that representing the restoration of the tower of Jean Sans Peur, forming part of the ancient residence of the Dukes of Bourgogne. A perspective of the unrestored building is given for purposes of comparison. The tower is of five stories, and of 15th century character; it seems to have been much neglected, and the renovations are thorough, including the opening out of windows, refacing in great part, and the substitution of a steep-pitched slated roof for the flat ogee covering. M. G. Haillard was the architect. Another work of restoration of a purely Classic character is that of the fine 16th century residence, once belonging to Madame de Sévigné, and known as the Hôtel de Carnavalet. It has been carried out from M. Roguet's designs. The library of l'Ecole de Droit, built last year from M. l'Heureux's designs (M. Chedeville, sculptor), exhibits a simple and effective mode of meeting the requirements. The plans show a rectangular chamber leading into a polygonal one; the latter is domed over with light iron and glass roof; two iron galleries are carried round the walls and are reached by circular staircases, also of iron; by this means the maximum of space is preserved for the book-shelves. A symmetrical and compact group of school buildings is to be erected in the Rue d'Alesia, from the designs of M. Vaudremer. The designs for the new Vaudeville Theatre (M. Magne, architect) indicate the use of a highly-decorated type of Renaissance; the principal front is adorned with busts of Scribe, Collé, and Desangiers, and terminates in a scale-coned circular cupola. A well-arranged fire-engine station is the Caserne de Sapeurs Pompiers in Rue Philippe le Grand and Rue de l'Aqueduc. The site is a triangle or rather pentagon, with streets on all sides. The central court-yard is enclosed by ranges of buildings two stories high, with towers five stories high at the three chief angles. These towers contain the superintendent's and officers' residences; along the sides are the stables, and over them the men's apartments, the wide end of the yard being covered in as a gymnasium. The building is treated with simplicity, the angle quoins being accentuated, and the effect is good. M. Soudée is the architect.

The fountains of Paris are well worthy of examination, not only as works of art in themselves, but as exhibiting solutions of the problem how to dispose of the water expended in display in the most effective manner. The mode most frequently adopted in this city is to direct several streams towards a central point; another is to allow the water to spring in several jets from the centre, and fall into a nearly flat basin, escaping in a thin almost unbroken sheet over the edge into a larger receptacle below. In the drawings of fountains constructed from the designs of M. Davioud, there are examples of each of these varieties—of the latter opposite the Théâtre Français, and of the former that in the Place de Château d'Eau. At the Château d'Eau the design loses much, as executed from the ill-modelling of the eight couchant lions, from whose mouths, with questionable taste, the water is spurted. They are almost dog-like in appearance, and are so disposed in groups of four as to leave two awkward intervals on the principal sides. In this room there are also a few casts in plaster of columns and capitals at the Palais de Justice, and in the older churches. In another court of the pavilion will be found models and drawings of the sewerage works, and the appliances for cleansing, repairing, and watering the streets of Paris—these are well worthy of attention, as exemplifying the enterprise, activity, and vigilance of the governing body of this city in matters relating to sanitation.

E. W. P.

ELECTRIC LIGHTING.*

M. FONTAINE'S treatise, translated by Dr. Paget Higgs, is an ably written digest of the art of electric lighting, showing its numerous applications, to what extent it can be applied to a multitude of industries, and the erroneous and prejudiced ideas that have been entertained of it. It deals rather in detailing the elements of electric lighting that have been practically tested, and the best conditions of its use, than in speculative theories. For lighthouses, maritime, and military works, few will deny the value of this light; but it is to show its value also for large workshops and showrooms that the author writes. He says very justly that its applications would be very limited if we should continue to deprive ourselves of light, as it is the custom in some manufactures; its value, however, is beginning to be recognised by those who are convinced that the present system of lighting is insufficient and uneconomical. There is an intelligent conviction that by intensifying light in our workshops, better products are turned out, nightly inspection is economised, and manufacture itself is facilitated. Hence many manufacturers are replacing their present system by lighting four or five times more intense. The Gramme machine, by which the electric light is obtained, has been applied in numerous instances since last year, when it had not more than a dozen applications. M. Fontaine's treatise is divided into twelve chapters, the first six being devoted to the study of the voltaic arc, the carbons, regulators, and magneto-electric machines, while the last six treat of the realised applications and the comparative costs of different sources of illumination. The voltaic arc—the chief method of obtaining the electric light—is fully described in the first chapter, and the experiments of scientific men to determine its properties, and the phenomena it presents are recorded. The voltaic arc is obtained by employing two carbon electrodes, between the ends of which a dazzling or luminous arc appears. It has been called the "voltaic arc" in honour of the inventor of the battery which produced it for the first time. The brightness of the arc depends upon the intensity of the current, the electrodes, and the medium. Potassium or sodium produces a more brilliant arc than one of platinum or gold. The researches of Despretz upon the length of the arc produced by different numbers of elements employed are recorded. Wheatstone, Faraday, De la Rive, Becquerel, Grove, Tyndall, Le Roux, Matteucci, Favre, and many other authors have been consulted. The voltaic arc results from the incandescence of a jet of particles detached from the electrodes, and projected from the positive to the negative pole. Foucault and Fizeau have discovered that the voltaic arc attains in brilliancy to half that we receive from the sun on a clear day, and therefore far surpasses the Drummond and other sources of light. Professor Tyndall has shown the marvellous heat of the voltaic arc by placing a piece of black paper in the reflected luminous focus, which is instantly pierced and ignited. The same effect takes place when a band of blackened zinc is placed in the focus, a plate of platinum has been heated to whiteness. In the Opera in Paris the electric light was employed to produce the effect of the rising sun, and in theatrical effects it has been largely used to reproduce physical phenomena, M. Duboscq, for instance, has reproduced the rainbow and lightning by its means, the former being rendered through the agency of several lenses and a prism. In the Paris Opera, batteries, instead of a steam motor, are used, as the architect objected to the latter. In the lighting of fêtes and public works during construction the electric light has been of great service. The Serrin electric light system has been used by the Spanish Northern Railway Company: the light was found to be regular and good, and hyperbolic and parabolic reflectors were employed. The expense per hour for material consumed was 2 90 francs per lamp—a saving of 60 per cent. on the use of torches, the fumes of which are inconvenient to labourers. The Exhibition in Paris, the Grands Magasins du Louvre, and several railway works have been executed by

* Electric Lighting; A Practical Treatise. By HIPPOLYTE FONTAINE. Translated by PAGET HIGGS, LL.D., A.I.C.E. London: E. and F. N. Spon.

the aid of this powerful light, and it has been found that workmen, not oppressed by the heat of day, can do more labour during the night if aided by a good light.

The chapter on electric "regulators," or lamps, is interesting. Electricians have long endeavoured to regulate and maintain at a constant distance the two carbons between which the voltaic arc plays. The author speaks of M. Serrin's regulator as the best. This apparatus is simple, works with precision, and gives a good light. The regulator of Foucault, perfected by Duboscq, is placed next. It consists of an electro-magnet or clockwork movement to actuate the bars of the two carbon carriers, which move by racks and wheels. The carbons are separated by clockwork, and also brought together by its means. Various other ingenious means of regulating the carbons are described, the electric lighting, without regulators, as patented by M. Jablochkoff, a Russian officer, in 1876, is mentioned, in which the carbons are placed side by side, and are separated by porcelain; various other improvements have been made by the same inventor. Chapters on electric carbons and magneto-electric machines follow, from which we gather that retort carbon gives better results than wood-carbon rods. The Gramme machine, to which the production of electric lighting is chiefly due, has been applied to several purposes. Its principal purpose is to transform mechanical force into electricity. M. Gramme exhibits at Paris this year, we believe, a machine which will give the greatest luminous intensity with the smallest motive force that has ever been obtained—a machine with multiple poles, intended to produce simultaneously several foci.

We proceed to notice the chapter on industrial application, as that of chief interest to architects. Electric lighting is so intense that it is aided by reflection from all objects it falls upon, and is thus diffused in all directions like daylight. Two machines are necessary, so that the shadows produced by one light may be illuminated by the other. Electric light is not found to be fatiguing to the eyes; it preserves the tints of colours—a great point in dying establishments and in workshops where it is desirable to discriminate colours. Rooms should not be much less than four metres high for the introduction of this light; and the following data of the areas lighted by a single apparatus may be useful:—"Generally there may be conveniently lighted with a single apparatus 500 square metres of fitters and tool shops, modelling rooms, &c.; 250 square metres in spinning mills, printing and weaving establishments; and 2,000 square metres of yard, dockyard, quay, and open-air works. A complete apparatus in France costs about £100, including lamp, conducting wire, transport, &c. Convenience as well as cost should be considered in estimating the advantages of this mode of lighting, and we are informed that the fire-offices have offered to lower their tariff for all buildings lighted by electricity. We have not space to mention the workshops in which this mode of lighting has been introduced. In one case, the Ducommun factories at Mulhouse, the cost has been £400, which is about that of 250 gas burners; while the total light exceeds that of 400 burners. Messrs. Sautter, Lemonnier, and Co., the well-known makers of lighthouse lenses at Paris, have introduced electric lights on a large scale; and M. Ménier has also employed them. To show the value of a luminous ceiling one of the halls of the great warehouses of the Louvre at Paris is stated to have been illuminated by a white light, soft and in all respects equal to sunlight. The light is transmitted through a frosted plate-glass panel in the ceiling from an upper chamber, and is reflected by tin plates placed above the light in the form of a truncated pyramid. Besides the large use of this light in Paris it has been employed in Austria in lighting a large skating rink in Vienna of 5,700 square inches, the light being supplied by two Gramme machines, placed at 135 metres from the rink, and worked by a portable 8-horse-power engine. Two reflectors prevent the waste of light upwards, and concentrate it upon the ice surface. We cannot refer to other applications to lighthouses, ships, and to forts, for which the electric light has been found admirably adapted; but simply mention that with equal light emission, it is stated "the electric light costs less than gas, and this in the ratio of about 1 to 2·26, with interest and deterioration, and of 1 to 7·17, without interest and deterioration." On the modes of lighting by incandescent carbons and Geissler tubes a chapter is added. We can recommend Dr. Higgs' translation of Fontaine's treatise to the consideration of the managers of all public buildings, factories, and workshops, and to the architect's attention. Indeed, as a powerful auxiliary to modern industry, lighting by electrical means cannot be over-estimated.

ARTIFICIAL MARBLE.

A PROCESS of making artificial marble has been recently patented in this country on behalf of Harriet G. Hosmer, of Rome, which differs from previous processes in the fact that limestone in the solid state is employed as the base instead of a mixture of plaster and cement. The limestone is worked by any suitable means to the desired form, and is then placed in a boiler furnished with a safety-valve and manometer, so that the pressure therein may be noted and controlled as may be required. The boiler is then filled with pure water at the ordinary temperature, care being taken that there is no mineral deposit introduced with the water. Care must also be taken that the water completely covers the objects placed within the boiler. The boiler is then hermetically sealed, and fire applied, and the water allowed to boil until the manometer indicates five "degrees" of atmospheric pressure if the objects are small, and six or seven degrees of pressure if the objects are large. When the heat reaches the above-mentioned point the water is allowed to cool until the pressure indicated by the manometer returns to zero. The water is then taken out of the boiler, either by means of a pump or a siphon, and the objects are removed from the boiler preparatory to being placed in the alum or coloured bath. If, however, steam alone can be introduced into the boiler (always maintaining the above-mentioned degree of heat and pressure) the result attained will be the same, the action of steam, not the presence of water, being necessary for acting on the stone. When it is desired that the objects should retain the natural colour of the stone, the alum bath should consist of pure water containing five degrees of alum, as indicated by the areometer. The articles must remain in this bath at least twenty-four hours, but they may be left in the same bath for a week, or for a month even, by which time they will acquire still greater hardness. The stone will, however, have become sufficiently petrified for all ordinary purposes in twenty-four hours. If pure water be used in the boiler, according to the process first described, instead of steam, the alum bath may be effected in the boiler itself, thus avoiding the necessity of removing the objects; but it must be remembered that the application of alum is only admissible when it is intended to preserve the natural colour of the stone. In such case the alum is put in the water before the boiling commences, and the objects must remain in the boiler for 24 hours after the pressure, as indicated by the manometer, returns to zero. The articles, when taken from the alum bath, may pass into the hands of the polisher if in the form of plain blocks, slabs, or flat pieces, but if they be in the form of statues, busts, vases, columns, or other ornamental works of art, they may be placed in the hands of an artist to finish, if required, as the stone does not attain its greatest hardness until it has become perfectly dry, which will require a fortnight, more or less, according to the size of the object. When it is desired to impart colour to the stone the coloured baths are prepared in the manner indicated below, in which the objects must be immersed, and must remain therein at least 24 hours. The coloured baths must be boiling, or very nearly so, and it is better to remove the objects to be coloured from the first boiler and place them in the coloured liquid while they are still warm from the steam or water. There is no danger, however, of injuring the stone, even if it should be put into boiling liquid while cold, or into cold water while the articles are still heated, but the colour penetrates deeper when both stone and bath are in a heated state. If it be desired to place an object a second time in the coloured bath in order that it may acquire a deeper colour it should first be placed in an oven at a temperature of from 80 to 90 degrees, in which it may remain ten minutes, after which it may be immersed in the coloured bath. To produce black or dark grey colour take of pure water 2 litres; red wood, 300 grammes; fustic wood, 120 grammes; sulphate of iron, 10 grammes; sulphate of copper, 2½ grammes. Boil the red wood and fustic wood for an hour and a half, then add the sulphates, and continue the boiling until all the salts are dissolved. Three or four minutes will probably be sufficient for this purpose, the solution may then be passed through a sieve, and half a tumbler of acetic tincture of iron added. Stone colour or lighter grey is obtained in the same manner, with a weaker solution. In order to prepare a red colouring solution take of pure water 3 litres; Brazil wood, 330 grammes; Scotaus (*sic*), 5 grammes; cream of tartar, 1 gramme; alum, 1 gramme. Boil the mixture until all the colour of the wood is extracted, and then pass the solution through the sieve in order to remove therefrom any solid matters that may be held in suspension therein. A yellow colour is obtained by adding to three litres of pure water extract of yellow wood of Cuba, 20 grammes; sulphite of magnesia or alum, 10 grammes. The mixture must be boiled until complete solution of extract is effected. In order to obtain a green colour dissolve in three litres of pure water extract of yellow wood of Cuba, 20 grammes; and 10 grammes of alum. Boil the ingredients as above, and then add carefully (by means of a wooden spoon, and keeping at a certain distance) as many drops of acid sulphate of indigo (Saxon blue) as may be necessary to give tone of colour desired. To ascertain the depth of colour pour a few drops upon white paper, or dip a piece of dry plaster of Paris in the solution. For a blue colour dissolve alum, 10 grammes; acid sulphite of indigo, 20 grammes in 8 litres of water, until the desired colour is obtained. As all the varied colours of aniline penetrate the stone perfectly, they may be used at pleasure. It is only necessary to dissolve the colour selected in a little alcohol, which is afterwards diluted with warm water, in which alum is dissolved in the proportion of 24 grains of alum to every litre of water. The solution may be even stronger in alum; this is for colours which are insoluble in water. For such aniline colours as are soluble in water no alcohol is necessary. They may be dissolved in boiling water in which a little alum or sulphate of magnesia is introduced. Care must be taken to select only those colours which are durable. The same colours which are permanent in cloth are permanent in stone, and in general the same rules which apply to the art of dyeing cloth may be applied to the art of dyeing stone. Pavements which are coloured, particularly if the colour is very delicate, and if there be fear of dampness, are better laid down in cement of a light colour. For the darker colours the cheaper darker cement is equally good. For the stone of which the natural colour is preserved no cement is absolutely necessary unless the place in which they are to be laid is particularly damp. After the objects have been taken out of their respective baths they are allowed to dry, during which process the work may be re-touched, if necessary. When dry they are reduced to a fine surface by means of pumice stone, after which a still finer surface may be given by means of a piece of slate, or still better, of lead, after which they may be rubbed with oil. When the oil is dry the articles may be rubbed with phosphate of lime, and the lustre will be rendered perfect. The ordinary methods of polishing marble will apply to the polishing of petrified marbles prepared by the above process.

A new fine-art institution is about to be erected in Glasgow at a cost of £14,000, from the designs of Mr. Burnet. The style of the proposed building is Classic, with a predominance of Greek feeling.

The Counterslip new Baptist chapel, Bristol, was formally opened on July 17th. It is Gothic in style, and is faced externally with brick. The extreme length of the new chapel is 91ft., and the width 30½ft., accommodation having been provided for between 800 and 900 adults. The architects are Messrs. Foster and Wood, and the general contractor Mr. J. Crick. Mr. Gardner has acted as clerk of the works. The undertaking will have involved a total outlay of nearly £11,000.

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ILLUSTRATIONS.

OLD HALL AT HAMBLETON—OLD HOUSE AT NARBOROUGH—BAY FROM HOUSE AT EGLETON—ST. FRANCIS HOME, SHEFFORD—NEW CATHOLIC CHURCH OF ST. BRIGID, ARDAGH—STUDIO AT HAMPSTEAD.

OUR LITHOGRAPHIC ILLUSTRATIONS.

SKETCHES OF DOMESTIC WORK.

THE subjects from Hambleton and Egleton may be regarded as quite characteristic of the domestic architecture of Rutlandshire. Elizabethan or Jacobean work of more or less merit is to be found in almost every village in the county. Perhaps the prevalence of this style may be accounted for by the abundance of good building stone ready to hand and suitable for such characteristics as mullioned windows, gable copings, &c., as well as for general walling. The latter is, in many cases, very effectively banded in irregular courses, with rubble and rough ashlar alternately. The garden front of Hambleton Hall is very slightly varied from the entrance front given in sketch. It is now a farm-house, and lately contained several suits of armour. The old house at Narborough, near Leicester, owes its picturesqueness to the projecting timber-framed bay window in the roof. No doubt this feature is a somewhat later addition, the main portion of the building being apparently Jacobean, but so completely draped with foliage that its details are scarcely visible.—J. LANGHAM.

"CHARLECOTE," HAMPSTEAD HILL GARDENS.

THE illustration shows a studio and chambers lately erected for C. Green, Esq. The whole of the elevations are faced with red bricks, the porch and the front windows are of cut and rubbed brickwork, the cornices and pediments being of red terra cotta. The studio on the upper floor is 18ft. high, and is warmed by an open fireplace and a German stove obtained from Nuremburg. The works were carried out by Messrs. Manley and Rogers, of St. George's-road, Regent's-park, the foreman of works being Mr. G. Dickins. The architects were Messrs. Batterbury, and Huxley, of 25, Great James-street, Bedford-row, W.C.

ST. FRANCIS HOME FOR BOYS, SHEFFORD, BEDFORDSHIRE.

THIS establishment is the diocesan school for orphan and destitute boys in the Roman Catholic dioceses of Northampton and Nottingham, and under its director, the Very Rev. Canon Collis, is in course of reconstruction and enlargement. The view gives the schoolroom and dormitory just completed, and the old chapel, which has been raised a story, and is intended to serve as the sacristy for the intended church. The boys are taught various trades, and the design has been influenced by the desire to give useful employment to the boys, who, under their able instructor, have done the whole of the carpenters' and joiners' work, portions of which, especially in the internal fittings, have been designed of an ornamental character, so as to afford opportunities for the exercise of skilled labour. The general contractor for the work in the schoolroom and dormitory, not done by the inmates, was Mr. E. Twelvetrees, of Biggleswade, the whole having been carried out from the design and under the superintendence of Mr. S. J. Nicholl, architect, 1, Caversham-road, N.W.

ST. BRIGID'S CHURCH, ARDAGH.

THE new church shown in our view, and now in course of erection, is one of many structures in progress throughout Ireland, which, even in remote districts, are fast superseding poor and often wretched buildings, in which poverty and politics condemned Roman Catholics, until within a recent date, to celebrate the rites of their religion. The site has been generously given by Sir George Fetherstone, Bart., and is prettily situate near the entrance gate to Ardagh House. The church consists of nave, aisles, chancel, transepts, and lady chapel under tower; also a commodious sacristy. The total internal length is 87ft. 6in.; the width, including nave and aisles, is 45ft. 2in., and in clear of transepts, 65ft. 2in. The walls are built of rubble on concrete foundations, and are faced with coursed hammered ashlar of light-coloured sandstone, with dressings of blue limestone, finely chiselled. The nave is divided from the aisles by moulded arches of Bath stone, supported on grouped polished red granite pillars, with marble bases and annulets, and carved Portland stone caps. The Lady Chapel will be groined in stone. Polished marble and granite pillars will be freely used in the interior to corbel shafts and arcadings. The roofs will be covered with slates laid in bands of colours, and the ceilings finished with pitch-pine diagonal boarding, divided into panels, with elaborate cornices and mouldings, and curved and moulded principals, dividing the church into bays corresponding with the arcading, the whole sized and varnished. The windows, glazed in lead quarries, having rolled cathedral glass in various tints, with coloured margins. The traceried windows are to be filled with painted and stained glass; the floors of encaustic tiles; the sittings, altars, and other interior finishings will be all carried out in keeping with the style of architecture adopted. The works are being satisfactorily carried out by Mr. Patrick Callam, builder, under the supervision of the architect, Mr. William Hague, 44, Westland-row, Dublin.

The new Roman Catholic church at Hadzor, near Droitwich, dedicated to St. Richard de Wyche and St. Herbert, was opened on Tuesday, July 16th. The church is built to accommodate 100 persons. It is a simple edifice of the Flemish brick style of architecture of the thirteenth century, built from the designs of Mr. C. A. Buckler, the builder being Mr. A. Stokes, of Droitwich.

The corner and memorial stones of a new Wesleyan Sunday-school and lecture-hall, in connection with Queen-street Wesleyan Chapel, Scarborough, were laid last week. The new building will harmonise with the old chapel, and be of red brick with stone dressings. The large room will afford sitting accommodation for over 600 adults. The contracts amount to about £1,800. The work is being executed from the designs and under the supervision of Mr. William Watson, of Wakefield, architect.

There has just closed in Berlin an exhibition of models for the Liebig monument. Twenty-one sculptors competed, five of whom, Begas, Pfuhl, and Sussmann-Hellborn, of Berlin, and Gedon and Wagmüller, of Munich, were invited to do so. The models will now be exhibited in Munich, where afterwards a committee, already appointed, will decide which model is to be accepted for execution.

The parish church of Sutcombe, Devon, dedicated to St. Andrew, and built in the Perpendicular style, has been in part restored, and further renovations are in contemplation. The architects engaged are Messrs. Bodley and Garner, of London. The church consists of a western tower, nave, north aisle, chancel, and south chancel aisle. The works embrace the restoration of the chancel-roof and renovation of the chancel generally; new stalls have been made with richly carved ends, the late type of ornament general in the church being strictly adhered to in the new work. The carved work has been carried out by Mr. Harry Hems, of Exeter. The roof of the chancel has been decorated in colour. The general works are by Mr. Allin, of Sutcombe.

The district of Hoyland, near Barnsley, is about to be provided with an independent water supply, in lieu of taking, as at present, from the Sheffield Water Company at a fixed rate of 1s. per 1,000 gallons. Messrs. Mitchell and Peacock, of Barnsley, are the engineers

COMPETITIONS.

ASHFORD.—On Thursday week the members of the School Board were engaged from nine o'clock in the morning until nine o'clock in the evening, in the selection of designs from the twenty-nine sent in for the new board schools. At length they reduced the number to ten, and in choosing three from these they were aided by the advice of the masters of the elementary schools. The three chosen bore the following mottoes: — "Abecedaire," estimated cost, £2,700; "Spero," £2,535; "Tuition," £2,700.

GREAT YARMOUTH.—At a meeting of the mayor, aldermen, and burgesses of the borough of Great Yarmouth, on Monday last, the following report of the New Public Offices Committee was confirmed: — "The committee, having carefully considered the designs sent in by the 41 competitors with respect to the probable cost, the light given to the courts, rooms, and corridors, the width of the corridors and passages, the sanitary arrangements, and the architectural merits of each of the several designs, and with the assistance of Mr. Edward Boardman, architect, of Norwich, whom the committee had called in, and who stated that he was entirely ignorant of the names of the authors of any of the designs, resolved unanimously to recommend the council to award the first premium to the design bearing the motto 'Beacon Blue' as fulfilling the requirements of the council more than any other design sent in, and for similar reasons to award the second and third prizes to the designs bearing respectively the mottoes 'Saxon' and 'Bona Fides.' The committee feel assured that the design of 'Beacon Blue,' when carried out, will not only answer the purpose for which it was intended, but also add to the architectural embellishment of the town. The specification sent in with the design stated that the author was confident that the building as designed could be carried out for the sum named in the instructions to architects." The mayor subsequently opened the sealed letters which accompanied the three designs sent in, to which prizes had been awarded, and it appeared that the design sent in with the motto 'Beacon Blue' was submitted by Mr. John B. Pearce, architect, of Norwich; the design sent in under the motto "Saxon" was submitted by Messrs. G. Nattress and G. Sedger, architects, of 31, Great James-street, Bedford-row; and the design sent in under the motto "Bona Fides" was submitted by Mr. Brightwen Binyon, architect, of Ipswich.

Last week, Mr. Edward Baker, said to be a master builder in an extensive way of business at Folkestone, was charged with being drunk and disorderly at Mersham on July 3rd. The magistrates sentenced him to twenty-one days' hard labour without the option of a fine, and issued a warrant for his apprehension.

On Saturday last the Archbishop of York consecrated the new parish church of St. Andrew, Drypool, Hull. The total cost of the fabric is estimated at £6,000. It is in the Geometrical style, and is built of red brick, with stone dressings. It has been constructed from the designs of Messrs. Adams and Kelly, of Leeds, and erected under a joint contract by Mr. Barrass and Messrs. Allan and Son.

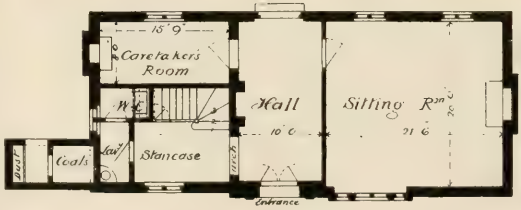
The guardians of the poor of the parish of Saint Matthew, Bethnal-green, have it in contemplation to improve the water supply of their workhouse establishment by sinking an artesian well into the chalk basin. Mr. Peggs, C.E., of Westminster, who has carried out the improved water supply at Shoreditch workhouse, will also carry out the necessary works here.

There has just been an informal opening of the new library-room connected with the Barnsley Mechanics' Institute, in the Public Hall Buildings. It has been fitted up from designs furnished by Messrs. Taylor and Senior, architects. The shutters to the book-cases are supplied by Messrs. Salmon, Barnes, and Co., of Ulverston. They are fitted together with copper bands, and the larger ones worked by an improved spring motion. In addition to the book-cases, revolving shutters are fixed in the archway communicating with the second reading-room.

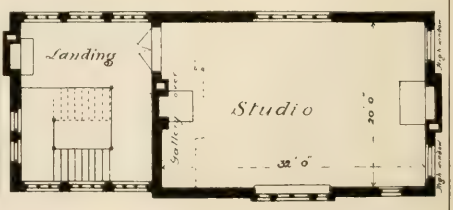
The local authority of Dorking having been threatened with an injunction for pollution of the Pipbrook by sewage, have invited the neighbouring authority of Leatherhead to co-operate with them in forming a joint scheme of drainage. They received a favourable reply last week, and negotiations are in progress.

Studio for Chas Green esq
Charlecote Hampstead
Messrs Battenbury & Huxley
Architects

Photo Lithographic & Printed by James Akerman 6 Queen Square W.C.

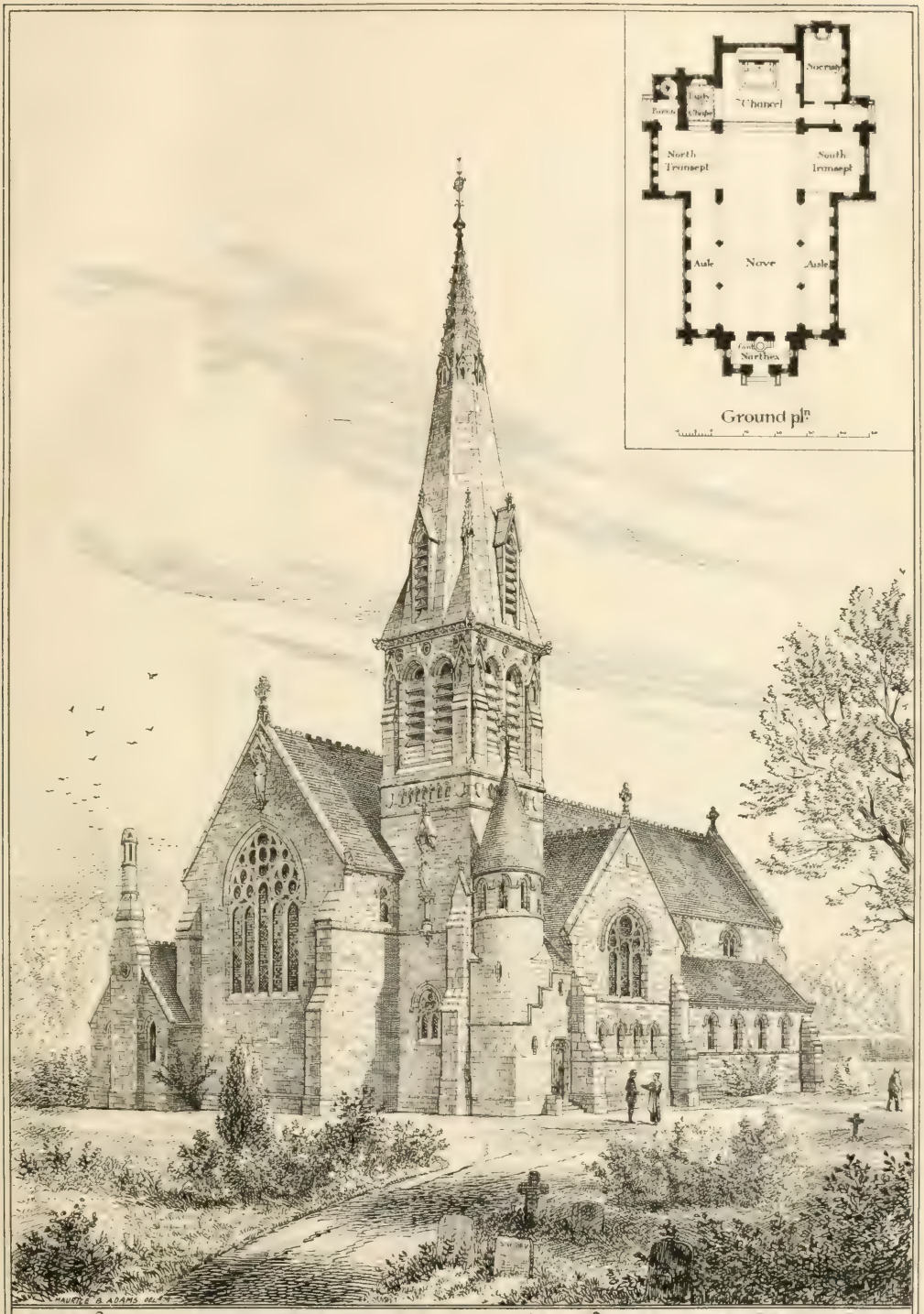


Ground Floor Plan



Upper Floor Plan

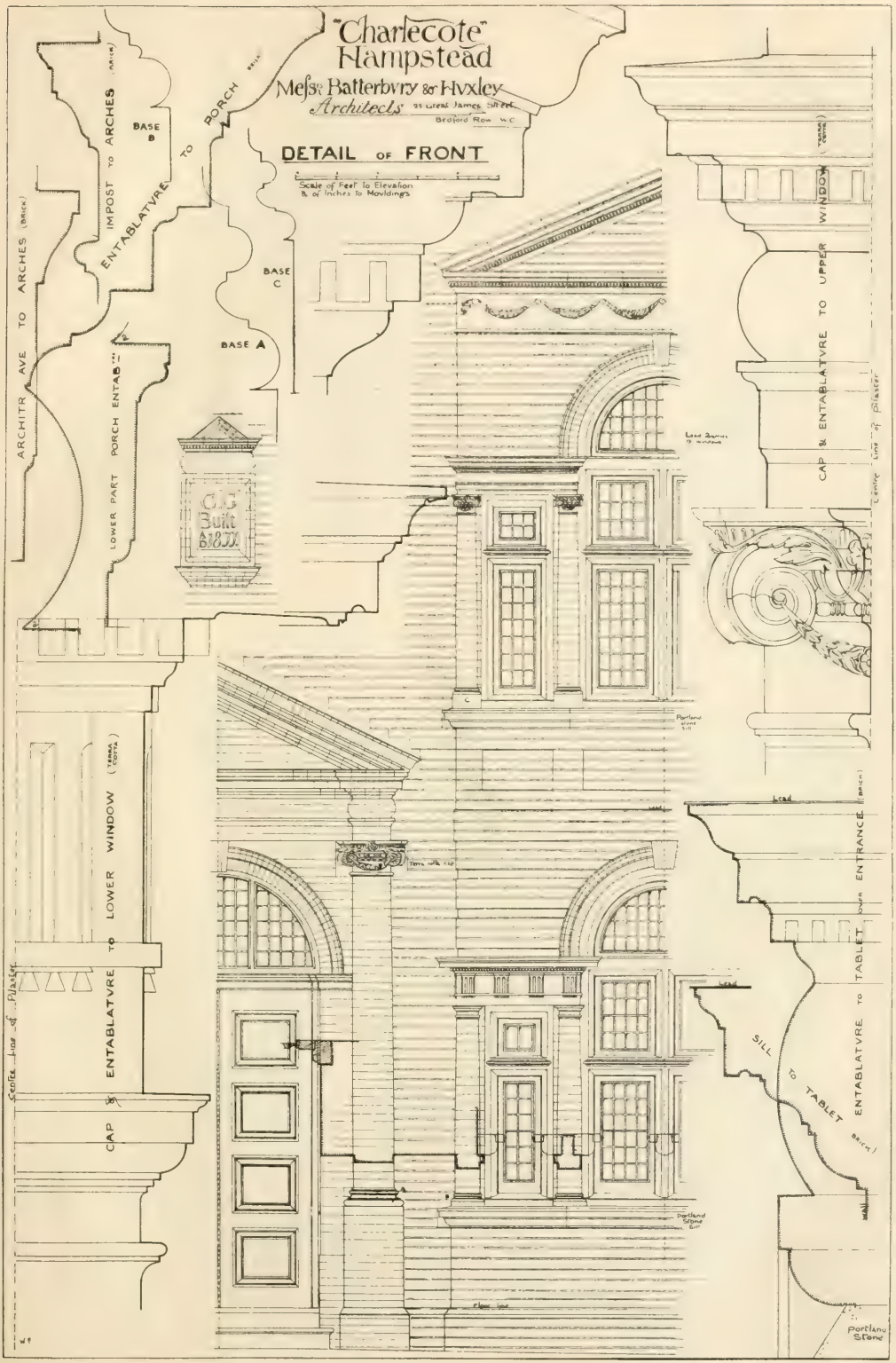
Engraved & Printed by James Akerman & Queen Square W.C.



NEW CATHOLIC CHURCH OF ST BRIGID ARDAGH Co LONGFORD

WILLIAM HAGUE ARCHITECT

Photo-Lithographed & Printed by James Akerman, 6 Queen Square W.C.



Lines Lithographed & Printed by James Akerman 6 Queen Square W.

A CHAPTER OF TRANSITIONISTS.

STYLES do not begin and terminate at momentary periods, nor by rigid lines, but have their interchanges and transitions as seasons have. Such was the Elizabethan age to carpentry. Attenuations of the ancient way reached through it; yet novel modes were strongly indicated from the beginning. Henry VIII. was a free patron of foreign genius. Torrigiano would, no doubt, have found a permanent asylum here but for the truculence of his disposition. The Swiss, Holbein, whose prominent gifts were painting and design, was called upon for more than the *embellishment* of architectural works—he was invited to *create* them; and his buildings would, in all probability, have been numerous, had his portraits been less attractive or less profitable. Girolamo da Trivigi (whom I conclude to be the Girolamo da Treviso, painter, architect, and engineer, who designed a façade of the Palazzo Leoni—now Sedazzi—at Bologna, and whose picture of the Virgin with St. Thomas à Becket remains in the Church of Santo Salvatore, as well as the miracles of St. Antony of Padua, in the Church of San Petronio) held the post of master mason, which Walpole thinks equivalent to architect. Both terms are based on the power to invent and delineate, as perspicuously stated by Horman:—"He is not worthy to be called mayster of his craft that is not cunynge in drawynge and purturynge. Non est architecti nomine dignus qui graphi disperitus non est." To Girolamo succeeded John of Padua, who was called "devisor of the King's works," though, at that late period of the reign, most of the royal buildings were complete. Jane Seymour's marriage to the King, in 1536, raised the fortunes of her brother Edward to the highest pinnacle. He was made Earl of Hertford, and, at Henry's decease, Duke of Somerset and governor of Edward VI. He immediately commenced the erection of Somerset House, on a plan, as is understood, of the King's devisor. It was in active progress from 1546 to 1549, when the Protector's reverses began, and (if completed) was probably not inhabited during his life. Although brickwork had been used by Cardinal Morton for his Lambeth Gatehouse, and by Henry VIII. at St. James's, the old method of rubble and ashlar, with abundance of timber, seems to have been adhered to at Somerset House, and, accordingly, buildings were demolished, as well for the sake of material as space. Britton observes that "the real name of John of Padua, and his works abroad, if any, are totally unknown—unless, indeed, he was the same person known as John Thorpe."* Against this it is to be considered that John Kaye, born at Norwich in 1510, entered Gonville Hall, Camb., 1529, was made fellow in 1533, and went to Padua in 1539, to study medicine, under Montanus, of Verona. He there took the degree of doctor of medicine, and, returning about 1544, was admitted *ad eundem* at Cambridge. The fact that he became successively physician to Edward VI., Mary, and Elizabeth might seem at variance with his appointment as architect to Henry VIII.; but he had the qualifications of erudition, travel, and observation, which would certainly recommend him to the King's favour. The more jealous segregation of the present time was unknown, and the anomaly was less in every way than in the case of William of Wykeham, who, under Edward III., held a similar office, conjointly with great ecclesiastical preferment.

Kaye obtained from Mary a charter for enlarging Gonville Hall, and converting it into Gonville and Caius College, under which title the house was re-dedicated in 1558. The works that ensued, including the three gates of "Humility," "Virtue and Wisdom," and of "Honour," remain. They exhibit the intermixture of Gothic and Italian features, and are attributed to *John of Padua* (under whom there probably officiated one Theodore Have, of Cleves). Longleat, Wilts, is traditionally assigned to him, and he probably began it for Sir John Thynne in 1567; but, dying during its progress, was succeeded by Thorpe, who effected the completion in 1579.

Kaye was master of his college from 1559 to 1573, in which year, after resigning the office, he died in London, on July 29. "*Fui Caius*" was his epitaph, and on the frieze of his tomb was inscribed, "*Vivit post funera virtus.*" The suffix, "of Padua," was most likely one of those honorary designations conferred by popular usage upon the eminent in art and learning, and was rather received than assumed by Kaye, whose ultimate distinction in medicine and letters induced him to relinquish it. Thus John of Padua became an incorporeal celebrity—a myth—but Dr. John Kaye an embodied certainty.

The account of Kaye's buildings at Cambridge show that the timber for them was bought standing:—

	£	s.	d.
Imprimis for trees bought of Sir Henrie Cornwall, out of Worboys and Ramsey Woods, in number 510	66	8	0
Item for hewing, marking, felling, lopping, squaring, drawing, and carriage by land and water from thens to Cambridge	46	4	8
Item Rothesey and his men for their worke by daye from Midsomer, 1566, until Midsomer, 1573	123	6	3
Item for boardes bought and brought into the colledge	29	15	10

It is worthy of notice that in 1563, only two years after the publication of L'Orme's work in France, John Shute, "paynter and architecte," who had visited Italy under the patronage of the Duke of Northumberland, dedicated to the Queen a folio volume, entitled, "The First and Chief Groundes of Architecture, used in all the Auncient and Famous Monyments." The means may thus be seen by which the classic taste was promulgated, and intercourse maintained with Italy through individual adherents of the Romish creed, after the Governments had been estranged by the Reformation.

The "royal merchant," Sir Thomas Gresham, was born in 1519, and, like Dr. Kaye, educated at Cambridge. He is most popularly known by the munificent presentation of the first Royal Exchange to the City of London, and the magnitude of his work was such as to cause commotion in the building world similar to that created by the Courts of Justice now. It was a necessary stipulation that "strangers" might be employed, but the permission gave palpable umbrage to bricklayers and other artisans at home, who resorted to personal collisions and affrays, just as though modern organisations had existed. Gresham's suburban seat, near Brentford, was called Osterley Park, and he had Mayfield, in Sussex (that had belonged of old to the Archbishops of Canterbury), as well as other places. The timber for the Exchange was brought from his estate at Rinxhall, in Suffolk, where the pits it was sawn upon are said to be still perceptible. But "he bargained for the whole mould and substance of his work in Flanders." The stone, the slates, iron, wainscot, glass, all came from Antwerp. The design was derived from the Bourse of that city, and Henrick, the architect, was a Fleming. The Queen went from Somerset House, in state, to the City A.D. 1570, dined at Gresham's new mansion in Bishopsgate-street, and performed, as she returned, the ceremony of opening the Exchange, which, from that time and incident, was termed "Royal." The character of the edifice is well known from contemporary engravings, which may be said to show the state of art in two cities, and faithfully portray the earliest example of the Anglo-Dutch style, so long followed in this country. Whether Henrick's connection with England continued or ceased after the completion of this great work does not appear, but the building itself was consumed in the great fire of 1666, and was then rebuilt by Edward Jerman.

Her father had left the crown so well provided with buildings that Elizabeth had little scope for the patronage of architecture; but this defect was amply made up for by the statesmen and courtiers of her reign. Brereton Hall, Cheshire, of which the Queen is said to have laid the first stone, contains a painting of Elizabeth, with the date 1579. This edifice is very Tudoresque in general forms, with ornamentation of foreign character superficially applied. The evidences are numerous, indeed, that the new style was displayed in superficial additions long before its general acceptation as an elementary and constructive principle. But Montacute House, Somersetshire, erected between that period and the end of the century, though retaining some leading characteristics of English design, is embellished with cornices and modillions, statues in hemispherical niches, segmental pediments, balustrades, and obelisks, more directly referable to original intention. Doric columns are placed about the terrace in the useful, if undignified, capacity of lamp-posts.

In the year that saw the Queen's "solemn and splendid procession" to the Royal Exchange, Kirby, in Nottinghamshire, was begun; "whereof," says John Thorpe, "I laid the first stone, A.D. 1570, for Lord Chancellor Hatton." Thorpe, and his volume, in the Soane Museum, are familiar to readers of the BUILDING NEWS, and the character of some of the designs was possibly influenced by Gresham's work. The pointed arch is gradually eliminated, and the obelisk made an accessorial feature, reflecting here the admiration that object excited after 1586 at Rome. Taking Lord Dorset's as his primary instance, and Sir Walter Cope's for his last, it would give to this architect an active course of more than forty years—1565-1607. (Cope's son-in-law, becoming Earl Holland under James I., gave to the latter mansion the title of Holland House.) To those who bear in mind that Cockerell and Tite were jointly engaged on the London and Westminster Bank, as were Digby Wyatt and Scott at the India Office, it will not be surprising to find Thorpe's name occasionally mixed with others, as at Longleat and Audley End. This consideration may help to reconcile the conflicting testimonies concerning Wollaton Hall. Claiming for Thorpe an intimate and practical connection with many of the buildings represented, the plan of Henry VII.'s Chapel alone puts a limit to such claims; while the testimony of Robert Smithson's monument, in the chancel of Wollaton Church, has the sanction of more than two centuries and a-half. The recent idea that he was clerk of the works is of little moment, because clerks then were really clerks, with educational qualities fit for holy orders or other learned callings. Thomas Larke, for example, was overseer of the works at King's College, Cambridge, but Thomas Larke was also a king's chaplain, and later on an archdeacon. As Robert was father of Huntingdon Smithson, architect of Bolsover Castle, Derbyshire, there is the greatest reason for wishing the Wollaton memorial to be truthful. Of Thorpe's end there are no authentic particulars, but had it taken place in France, as his reference to the Queen-Mother's (Mary Queen of Scots?) house in Paris might make possible, his drawings would have more probably perished.

* "Architectural Dictionary."

It has been elsewhere demonstrated, and is perfectly obvious, that without a corresponding condition of the paper manufacture the triumphs of the modern burin would have been unachieved. In Thorpe's day the home-made article of chief repute was "London brown." The material of his volume bears different water-marks. A portion, that may be Dutch, has a shield charged with a bunch of grapes, and the inscription IVAVODE on a scroll below. On another part is a high-stemmed vase of Cellini pattern that would indicate Italian make. France is remembered by the fleur-de-lis; while a yet further part, impressed with a frothing tankard, vividly suggestive of plebeian beer, is assumably from the Low Countries.

The princely offices of the most princely of newspapers, the furbished College of Arms, and a few nominal memorials at Blackfriars, are not far from the site of a destroyed palace called the King's Great Wardrobe. Among the ministers of fashion in that courtly vicinity lived Ignatius Jones, a Romanist in creed, a clothworker and tailor by vocation. His son, born in or about 1572, and christened Inigo, was in due time apprenticed to a joiner; and thus, in a practical if humble way, began a great acquaintance with the building arts; for, though not earliest, he became the most perfect and refined of Renaissance pioneers, and has been styled the English Vitruvius.

Early patrons (notably Lord Pembroke), attracted, doubtless, by his graphic promise, sent him to study landscape painting in Italy, where, as an English Catholic, his welcome would be assured. But, in the then absence of any special school of landscape art, he must have found himself dependent on spontaneous effort, and the intention of becoming a painter, if at any time seriously entertained, was relinquished. Architecture was naturally more congenial; and, leaving Venice for Vicenza, he reached the birthplace of Palladio, whose works abounded near the spot; and where his death had occurred so recently as 1580. Thence, he was called to Denmark, and became architect to Christiern IV. The sister of this prince (Anne of Scandenburg) married James VI. of Scotland at Upslo, Norway, in 1589, and was crowned at Edinburgh, the next year. She had been educated as a zealous Lutheran, but a joyous temperament, with an agile habit and well-formed person, kept her free from intolerance. It is needless to inquire, therefore, whether the masks and revels that were so frequent after James's accession to the English crown, and in which Ben Jonson was official of the Muses, had not a friend at Court? Christiern came to visit his royal relatives in 1606, and brought Jones over in his retinue, so that an important date is clearly fixed. Jones was appointed architect to the Queen, and thus his employment at Somerset House may be traced. The post of Surveyor-General was also bestowed upon him in reversion. The death of Prince Henry, the heir-apparent, in 1612, threw a gloom upon the royal household, and gave the architect opportunity for a second visit to Italy. That visit proved of some years' duration, and enabled Jones to prepare and fortify himself by further observation and renewed study of the best examples and authorities to effect the masterly productions that give unfailing lustre to his name. His grand patroness, the Queen, died at Hampton Court in 1619; but he was now well settled in the service of the State. In 1620 he was made a commississioner for the repair of St. Paul's Cathedral, and three years later began the work. But the most admirable and permanent monument of his talent is the design for the palace at Whitehall, where the banquetting-house (now the Chapel Royal), the only executed portion, remains in eloquent attestation.

From this great name the line of Renaissance architects, as also that of Surveyors-General, may be followed. Jones fondly hoped that Webb, his son-in-law, would succeed him in the atter office, but Sir John Denham's claims prevailed. Within a stone's throw of the Chapel Royal stands, if I mistake not, the "mouse-trap" of Vanbrugh, and a memoir of the surveyors (or materials) from that locality would be a graceful contribution to the "Dictionary" now approaching that prolific letter.

In provincial carpentry the old architectural features were but slowly superseded. The western counties long maintained the native forms, and John Abel, carpenter to Charles I., was extensively employed there. He saw the light in 1577, and was laid to rest in Sarsfield churchyard, A.D. 1674. At that time Anne, the after Queen, was ten years old.

THOMAS MORRIS.

ARTS, MANUFACTURES, AND MINES.*

IN these days of literary productiveness, the dictionary or encyclopædia form has considerable advantages, for it is quite impossible now to keep one's book-shelves *au courant* with the recent literature of any branch of science, art, or manufacture; and practical men are apt to turn immediately to a good index or to a dictionary for any special information they are in search of. Hence the unquestionable advantage of manuals and books of reference. There is, however, one disadvantage of the dictionary: its information is continually passing out of date, and every five years, or a decade at the most, a revision or a supplement becomes necessary. The most satisfactory form of literary production now-a-days is undoubtedly that of the weekly or monthly journal; it is a running index that never gets old, and a full index makes it therefore more reliable than the cyclopædia form. Dr. Ure's "Dictionary of Arts, Manufactures, and Mines" has long enjoyed a reputation as being one of the most handy textbooks devoted to the branches of which it treats, but it was found that when the last pages of the third volume were printed in 1875, several of the earlier articles needed revision or addition, owing to the rapid advances that had been made. A supplementary volume has just been issued, in which all the changes and additions have been recorded, and the four volumes now represent pretty completely the present condition of human knowledge and industry in the great departments treated. The names of the authors of the new articles are a sufficient guarantee to the reader. Thus we find Mr. Emerson Bainbridge has written the articles on "Safety Lamp" and "Heat," Prof. Bischof on "Spongy Iron Filter," Mr. J. Coleman, Commissioner of the Philadelphia Exhibition, on "Agricultural Mechanics," Mr. T. B. Jordan on "Boring Machines," and Mr. A. Ransome on "Wood-working Machinery." The editor also expresses his obligations to the *English Mechanic* and other journals, and our own pages have been laid under contribution. We may turn at random to a few subjects. Under the head "Cement" we have the following quoted from the German *Berg und Hüttenmännisches Jahrbuch*: "The manufacture of Portland cement is not so widespread in Germany as in England, but something resembling the English material is prepared near Kufstein from the natural marl strata of the lower tertiary formations. Prof. Fuchs, of Munich, thus explains the theory of cement manufacture. The carbonate of lime becomes caustic on burning, and acts upon the clay in such a manner that the silicic acid is set free by means of the caustic lime, and combines with the lime upon subsequent treatment with water, producing a chemical product (hydro-silicate), the presence of alkalies by their substitution through heat favouring such reaction. Further investigators have shown that cement owes its quality of hardening to the presence of the silicates and aluminates of lime formed by the action of heat. . . . To manufacture water-pipes from cement equal quantities of the material and of hydraulic sand are mixed with the necessary amount of water, and this mixture is poured into the pipe moulds, the sand being previously washed and well mixed with lime in a proper apparatus. The interior of mould is rubbed smooth with dry graphite powder and a linen rag. The core is then put in, the cement introduced from the mixing apparatus, and pressed down with a wooden rammer. For a 4in. tube 3ft. 6in. long, 1 cubic foot, or 58lb. of lime, and 1 cubic foot of washed sand are used. After the mould has been filled, the screws that keep it together are tightened to ensure the cement being equally compressed throughout. The exterior of pipe is octagonal. During the setting, which takes place in from two to four days, the core must for the first 12 hours be slightly turned every half hour. After 12 hours the core may be withdrawn." The estimated cost for such pipes is about 5d. per foot. Under "Furnace" some useful information is given respecting muffle construction. M. de la Bastie's process for toughening glass is described in detail, and many valuable experiments are recorded. "Iron and Steel" have been exhaustively handled, and the additions contain Mr. Barnett's process for steeling iron, and Professor Barff's method of preventing corrosion. From the latter we read: "The oxide (formed by the steam) is harder than the original iron. . . . If the operating chamber is heated only to 500° Fahr., and the exposure is continued for only five hours, a surface is obtained which will resist emery paper for a considerable time, and which will not rust within doors, or after any moderate degree of exposure to moisture. If the oxidising process is conducted at 1,200°, and continued for six or seven hours, the surface will resist any exposure to weather." The Pulsometer is described. Rock-boring machinery appears to be very completely handled. Thus, the various sorts of compressing engines are detailed. We have descriptions of Sommeiller's compressor, used in driving the Mont Cenis Tunnel, Ferroux's, used in the St. Gothard tunnel, various rock-boring tools, and every detail. Under the article "Ventilation," Mr. Martin Tobin's system of ventilation is recorded, the *Times* notice of the system being given in full. We have so recently described and commented upon this plan, that it will be superfluous to say more than that the system, correct in itself, is by no means a new one, and has been adopted from time immemorial in sundry forms. The inward flow of air up the ascending tube is determined by the difference of the densities between the inner and outer temperatures of a room, and the more the internal air is rarefied or consumed the greater will be the force of the entering current, and thus the air adjusts itself to the demand, and it is said to be only necessary that the inlets should be sufficient for the maximum demands of the room. Now, inlets over doors and by windows act precisely in the same way in ordinary closed rooms, but we have certainly need for outlets in crowded rooms as well as inlets, as our own experience of buildings, unprovided with proper outlets for the vitiated gases, proves. Under the article "Wall-papers" we have some interesting facts regarding the dangerous effects of arsenical wall-papers. It appears that red papers, coloured with coralline dye, must be looked upon with suspicion, though the results of analysts have shown that pure coralline is not poisonous, and may be employed as a dye, but that injurious effects have arisen from fixing it by an arsenical mordent which acts injuriously upon the skin. Under "Water," the additional information given is pretty full and concise. As regards filters, Mr. Hunt, the editor, speaks highly of both Mr. Spencer's and Prof. Bischoff's filters, the magnetic oxide of iron removing all trace of organic matter. Several additions have been made under "wood-working machinery." We find among sawing machines Messrs. Ransome's "roller feed frame" for logs, and the band saw noticed, besides various improvements in deal and flitch frames by Mr. Frazer, also Furness and Co.'s four-cutter planing and moulding machine, Wurr and Lewis's labour-saving band and circular saw, general joiners, moulding, shaping, and dressing machines, &c. In wood preservation

* Ure's Dictionary of Arts, Manufactures, and Mines. By ROBERT HUNT, F.R.S., Keeper of Mining Records, &c. Vol. IV., Supplement. London: Longman, Green, and Co.

acetate of iron is mentioned as a remedy for fungous growths, and sulphate of iron, bichloride of mercury, &c., for preserving wood, and a good stain for wood is said to be a mixture of 8oz. of tallow, ¾oz. of wax, 1 pint of oil of turpentine, melted together and rubbed in. In a postscript a few additions have been made to this supplementary volume; the question of the electric light and its application to our lighthouses is one of them, and we also notice under gases the liquefaction of oxygen and nitrogen made by M. Raoul Pictet recently, and a short description of the phonograph and telephone. We can confidently recommend Mr. Hunt's supplementary volume to all manufacturers and students of the industrial arts as the most recent compendium of the kind, and as bringing up to the latest period the various branches of applied science. Those who have the three previous volumes will find the fourth to be an indispensable addition.

THE LATE MR. H. F. LOCKWOOD, ARCHITECT.

THOSE interested in the architectural progress of Bradford, as well as the profession generally, will hear with regret of the death of Mr. Henry Francis Lockwood, the leading partner in the well-known firm of Lockwood and Mawson, which occurred at his residence, Heron Court, Richmond, Surrey, on Sunday morning last. Mr. Lockwood, we understand, had been in a precarious state of health for some time, though his natural activity did not allow him to remain merely a passive member of the firm, and he attended to business till within a very short time of his decease. We hear the malady he suffered from was cancer. Mr. Lockwood was a native of Doncaster, commenced practice in Hull at the age of 23, and was in his 67th year. He was a pupil of the late Mr. Peter Robinson, of London, and was engaged at the termination of his articles in superintending the rebuilding of York Castle. Coming to Bradford, in 1849, when that rising town was just commencing to develope its resources, Mr. Lockwood found a large field open for his energies. In conjunction with his partners, Mr. Wm. and Mr. Richd. Mawson, Bradford owes much to him; indeed, many of the principal structures in that town have been erected from the designs of this firm. We may mention the Town Hall, won in competition, the Markets, St. George's Hall, the Bradford Exchange, Airedale College, &c., some of which have been illustrated in our pages. In Halifax Mr. Lockwood has been largely engaged upon buildings on the White Swan estate, and a bank is about to be erected there from his designs. But the greatest work, one which will probably add most to Mr. Lockwood's reputation, was the planning of the town and park of Saltaire, near Bradford, founded by the late Sir Titus Salt, for whom he carried out besides numerous public and private works. In these works Mr. Lockwood possessed the entire confidence of his patron. The new town of Saltaire, near the Aire—from whence and the founder's name it derives its designation—contains an immense alpaca factory, warehouses, and hundreds of cottages, with wide streets, squares, and gardens, schools, and every requirement for a large industrial community, combining every modern improvement. The mill is of great length, is built of stone from the neighbouring quarries, and is in the Italian style. Sir Titus Salt spent half a million or more of money at Saltaire. Of other buildings we may mention the Inns of Court Hotel, London; mansion at Broomfield for J. Crossley, Esq.; the works of M. Scheppers Loth, Belgium; works at Asnières, near Paris; and at Dusseldorf and Alsace, and the Government Rifle Factory at Enfield. Kingston College and St. Stephen's and St. Mark's Churches, Hull; the South Cliff Church, Scarborough; St. Stephen's, Twickenham; and Cleckheaton Chapel, Leeds, are from the designs of this firm. In 1870 he was appointed one of the twelve architects to compete for the New Law Courts, and since that time Mr. Lockwood, in connection with Mr. Mawson, has been engaged in the erection of many public buildings in the metropolis. One of the largest buildings of a mercantile class is the extensive block of shops and showrooms in Holborn Viaduct for Mr. Charles Meeking; close to this may be mentioned the City Temple—another work of the firm. Warehouses at Liverpool, Hull, Bradford, Barnsley, Dewsbury, Pontefract, Carlisle, North Bierley, Haslingden, &c., were built from designs by this architect. Of more recent buildings we may mention the warehouses for the Merchant Taylors' Company, the Civil Service Association in Bedford-street, recently completed, of red brick and terra cotta, and the Fore-st. company's warehouse. Lately the firm became successful competitors for the new Dublin Markets described by us, and a new bank at Hull is about to be commenced from their designs. Messrs. Lockwood and Mawson have been largely engaged in competitions, and we understand that the firm has kept a separate staff for this class of practice. Mr. Lockwood moved to London in 1871. He was educated in the Classical school, though many of his best works are Gothic. St. George's Hall, Bradford, is undoubtedly one of the most successful of Mr. Lockwood's earlier works, and evinces a keen insight into the adaptability of Classics. In the design for the New Law Courts, Messrs. Lockwood and Mawson adopted the Gothic style, the details and features of which design are largely borrowed from Italian sources. The character of this design, as that of others by the same architects, is highly florid in treatment; the voussoirs to the arches are of different colours, and there is much in the spirit of the composition that resembles Sir Gilbert Scott's design for the same work. Another important competition in which Mr. Lockwood was engaged was for the public offices of Leeds. In this instance an Italian style was chosen, and the drawings we remember seeing were remarkably bold and artistically coloured in sepia, and displayed considerable knowledge of Classic design.

Mr. Lockwood was a man of varied attainments, and, in his own profession, a devoted student. He was the author of several works—one a description of the fortifications of York—and the profession will lose in him an accomplished member. Though a very successful member of his profession he did not belong to the Institute, albeit he was a F.S.A., and a member of the Archæological Society. The funeral took place on Wednesday last.

THE NEW EDDYSTONE LIGHTHOUSE

MR. J. N. DOUGLASS'S design for the new Eddystone Lighthouse is much larger than that of Smeaton, and varies considerably therefrom. Fundamentally the same general form is to be adopted, and the shaft of the tower is a concave elliptic frustum—realised in Smeaton's original conception as the bole of an oak—but, in order to give weight and solidity to the substructure, with corresponding power of resistance to the violence of the waters, the lower course of masonry up to and inclusive of the twelfth, are to be perfectly cylindrical in form up to the level of about 3ft. above the high-water level of ordinary spring tides. At this point there is a diminution of more than 8ft. in the diameter, forming a commodious landing platform, whence springs the shaft proper of the tower. The diameter assigned to the cylindrical base is 44ft., and that of the tower at its springing is between 35ft. and 36ft., at the height of a little over 22ft. above the foundations. The circular shaft attains its smallest dimensions (18ft. 6in. diameter) at a height of about 134ft. above the rocky bed of its foundation; swelling out, with a bold and graceful curvetto, to an enlarged diameter of 23ft., maintained up to the level of the gallery-course or lantern-floor, at a total height of 142ft. above the base of the lighthouse, of 122ft. 6in. above the level of high water of ordinary spring tides. The magnitude of this noble light-tower will be at once apparent by comparison with the similar dimensions of its existing predecessor. Smeaton's shaft diminishes from a diameter of 34ft. at the foundation-course of 26ft. at the level of high water ordinary spring tides; and thence to 20ft. at the entrance door, and 15ft. at the top, the gallery-course being but 61ft. above high water mark, and the lantern-floor about 7ft. higher. Thus the new light will be displayed at an elevation 55ft. greater than that of the old one, and its range of visibility and efficiency will be proportionately extended. The structure is to be built entirely of granite, and to be entirely solid (except a small water tank) up to the level of the entrance floor, at about 22ft. above the landing platform; the access from low water mark being by an outside step ladder, formed of gun-metal cleats, recessed in the granite below the platform, and projecting from the surface of the tower above that level. The foundation is to be formed by cutting away the rock, in benchings or steps, for the first four courses, all the stones which bed on the rock being secured thereto by metal bolts. Throughout the entire structure every individual stone will be closely united, or bonded in to those surrounding it, by solid dovetail projections, fitting into corresponding recesses; and each course of stones is similarly to be connected with those above and below it, so that in this manner, when set in Portland cement, the entire mass will acquire almost the homogeneity and strength of the solid granite rocks from which its component elements were quarried, as has been amply demonstrated by experience. The hollow upper part of the tower will be similarly built, the rings being formed of single stones running through from the inside to the outside of the shaft. The internal diameter, as proposed, varies from 11ft. 6in. to 14ft., and the thickness of the rings from 8ft. 6in. to 2ft. 3in. This part is to be divided by arched granite floors into nine stories, apportioned as stores, coal, oil, crane, living, bed, and service rooms. The door and window openings will be provided with gun-metal doors, sashes, and shutters; and the general fittings of the tower are proposed to be of the same character. The total quantity of granite in the proposed new tower is approximately something less than 69,500 cubic feet, giving to the mass a total weight of about 5,150 tons of masonry. The metal work in cast, malleable, and wrought iron in gun-metal, Muntz-metal, bolts, copper and brass, and other materials, will make up a gross total of about 50 tons more, or 5,200 tons in the whole. The time allowed for the completion of the work is five years, giving an average of 1,030 tons to be erected in each year, practically limited to the summer season, so far, at least, as the actual work at the rock is concerned, inasmuch as during the winter half of the year it is impossible to carry on operations of this kind at all; and, indeed, the work can only be executed intermittently even during the summer months.

EFFLORESCENCE ON BRICK WALL

IN a recent number of the BUILDING NEWS (see page 415, Vol. XXXIV.) we gave the substance of a paper by W. Trautwine published in the *Journal* of the Franklin Institute, in which he traces the cause of the disfigurement of brick walls to the sulphur existing in the coal consumed in the processes of manufacture and of domestic life. Mr. Henry Pemberton, in another paper "On the evil effects arising from the use of dolomite lime in building brick walls," in the same journal, remarks upon the above contribution. Pointing to the proximate causes of the mischief, Mr. Pemberton says they are twofold. "First, the existence of silicate or other salts of magnesia in the brick clay, converted into sulphate of magnesia in the process of burning in the kilns, by the sulphurous vapours from the coals; and, secondly, the employment of lime containing magnesia for the mortar used in the walls, which, by the absorption of the sulphurous vapours of the coal gases in the general atmosphere of the city, becomes converted into sulphate of magnesia, and being dissolved by the rain, penetrates the substance of the more or less porous bricks, efflorescing ultimately upon the surface." The writer points out more serious evils than the unsightliness of this white efflorescence—namely, the disintegration of the mortar, the washing out of the joints, causing the destruction and fall of chimneys, &c. The writer observes that the salts of magnesia formed in the brick during burning, though it may account for the first appearance of the white salts, are insufficient to explain its reappearance, but that the magnesian lime used in the mortar is the main source. The author next shows the contradiction between

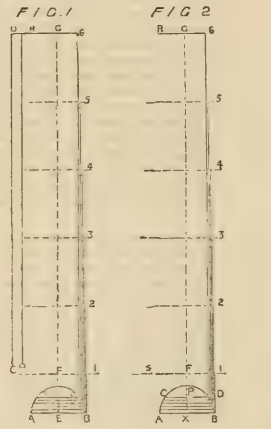
the statements of European writers, as to the influence of magnesia in lime for mortar, and builders' experience. Thus, in Muspratt's "Chemie," the analysis of ancient and modern mortar is given, and it is there shown that in Vienna the mortar used contains lime and magnesia in the ratios of from 5 to 1 to 2 to 1, though Wagner, in his "Chemischen Technologie," says that the effect of 10 per cent. of magnesia in the lime makes it become "lean," and 25 to 30 per cent. renders it perfectly useless. Mr. Pemberton found in Philadelphia that no lime available for chemical purposes would be accepted by builders, the latter using a strong magnesium lime, seldom if ever containing less than 30 per cent. of magnesia in the calcined lime, while lime for chemical purposes containing over 98 per cent. of carbonate of lime is sold at a lower price for agricultural uses. A fair average of these magnesian limes shows upwards of 37 per cent. of magnesia, or only 3·08 per cent. more lime than would be required for a perfect dolomite. It is readily seen how easily a cement composed of a substance, easily dissolved and formed into a soluble salt, must become disintegrated or washed away in the presence of sulphuric acid. The author shows how enormous is the quantity of sulphuric acid furnished by the coal consumed in that city—that 6,000lb., or 3 tons of coal, render acid 480,000lb. of water. From a consideration of these facts the author advocates the use of a free or pure lime. Why bricklayers prefer mortar made from magnesian lime is, "that it forms when slacked a fatty gelatinous mass, absorbing much water, allowing a large quantity of sand to be mixed with it, and the bricklayer can spread out the mortar as far as he can reach without removing his feet from their position. He places the brick in line upon this bed of mortar, placing as he does so a little mortar on the end of each brick as laid, until perhaps seven or eight or more are in place, then points up the brick with the trowel on the face of the work. With pure lime mortar this plan will not do." The mortar becomes too firm and is less pasty, and only two or three bricks can be laid before it sets. The author says this is only a local habit, as in Pittsburg, where only a pure lime is obtained, the bricklayers use no other, and no efflorescence takes place; and he mentions his experience in the erection of some buildings in Philadelphia, in which case a pure carbonate was obtainable at a cheap rate; but the builder and bricklayers pronounced it worthless, and it was found cheaper to pay 30 per cent. more for lime that the workmen were accustomed to, and which set less quickly. Mr. Pemberton's facts and experiences are interesting to us in England, and it may be worth while to inquire how far the same habit prevails amongst us. Numerous buildings are subject to the incrustations mentioned, due to the peculiar property sulphate of magnesia possesses of efflorescing, and which property is derived from the lime and magnesia in the brick clays and the sulphurous vapours in the air.

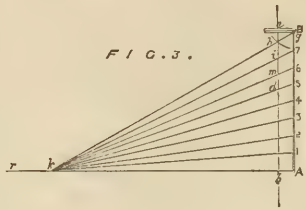
In the paper of Mr. Trautwine (q.v.) some suggestions are given, as, for instance, that pressed and ornamental bricks should be burned with wood or coke, but the main remedy is to use pure lime in the mortar. When the bricks covered with this efflorescence of salts become wet the compounds dissolve; and, on dry weather succeeding wet, the solution evaporating from the bricks leaves them coated with the same compound.

DIMINUTION OF CIRCULAR CHIMNEY SHAFTS OR COLUMNS.*

FIG. 1.—The upper diameter of a column is less than its lower diameter, but the gradual diminution between them should not be made by straight, but by curved lines. The usual mode of describing the curved contour of the diminution is as follows:—Let *a b* be equal to the lower diameter of the column, of which let *e f g* be the line of the axis perpendicular to *a b f g*, the height of the column, and *r* 6 its upper diameter. On *a b* describe a semicircle, and from *r* and 6 draw lines parallel to the axis, cutting the semicircle in *s o*; divide *s a* or *o b* into any number of equal parts, the more the better, and divide the height, *f g*, into the same number of equal parts, as 1, 2, 3, 4, 5, 6, and through these draw lines crossing the axis perpendicularly. Then, by drawing lines parallel to the axis through the corresponding divisions in the semicircle meeting these points, the curved contour of the column will be obtained, and by bending a lath so as to pass through these points the curve may be drawn.

Fig. 2.—The same thing may be obtained in a manner somewhat different, as here shown. In this *a b* is equal to the lower, and *c d* to the upper diameter. The points in which this latter cuts the semicircle being found, the portion of the radius, *x p*, is divided into certain equal parts, and the height of the column, *f g*, into the same number of equal parts, and from the points where lines parallel to *a b* drawn through the divisions in *x p* meet the semicircle, other lines, parallel to the axis, are drawn as before to intersect the lines drawn through the divisions of the height, 1, 2, 3, 4, 5, 6.





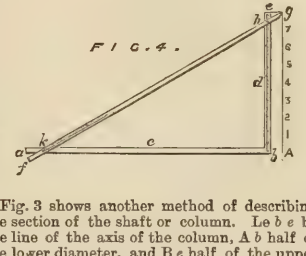


Fig. 3 shows another method of describing the section of the shaft or column. Le *b e* be the line of the axis of the column, A *b* half of the lower diameter, and B *e* half of the upper diameter. Take in the compasses the length of the semi-diameter at the bottom, and setting one foot in the extremity of the upper diameter at B, with the other foot across the axis at *h* produce the lower diameter indefinitely, as A *r*, and through B and the point, *h*, on the axis draw a line cutting A *r* in *k*, then from *k* as centre draw any number of lines as *i* 7 and *m* 6, &c., and make each of them, as *i* 7, equal to the lower semi-diameter.

In Fig. 4 is represented a trammel for doing the same thing as has been described; *a b e i* a right-angled rule, kept to its form by the angle-piece, *c d*. In the limb, *b e*, is a groove, which is made to coincide with the axis of the column, and in which slides freely a stud, *h*. The other arm, *a b*, of the rule carries a stud, *k*. The rule, *f g*, has a groove or slot sliding on stud, *k*, and its other end carries the stud which slides in *b e*. Now, it is evident that if the points, *k b h g*, of the trammel be adjusted in accordance with the preceding description, the point, *g*, will on the rule, *f g*, being slid along, guided by the grooves, describe the elliptic curve, A, 1 2 3 4 5 6 7 *g*.

* Extract from paper read by R. M. BANCROFT before the Civil and Mechanical Engineers' Society.

COOL ROOMS v. VENTILATION.

AT this season of the year we have various complaints of defective ventilation in our offices and stuffiness in our domestic apartments. A multiplicity of contrivances are before the public, with the object of remedying these evils; still we have much the same complaints that we had years ago. These arise from various misunderstandings. It must not be imagined that cool rooms are the best ventilated, or that because we have large apertures in a room it is necessarily perfect in ventilation. A large stream of air may be passing in at one aperture and out at the other, and yet the room be imperfectly ventilated. A rapid draught of cold air through a room, say from a window to a doorway, does not sweep out the air within the room—it leaves certain stagnant places and eddying corners, like we see in a pool of water sometimes, or in a river through which a mid-channel stream is running. These stagnant corners of the room may remain for a long time—the room may be cool, but the draught is not pleasant nor desirable. The object is to produce a thorough displacement of the air in a room, a continual change of all the air; the inlets should be well divided and distributed to afford numerous thin streams of air, and these should be placed somewhere at the breathing level, either above or below it. Among inlet arrangements the window-sash and door present us with the simplest kind. One of the plans we can strongly recommend is to fit a deflecting board to the middle rails of a sash window, and bore openings through the lower top rail, by which means a thin sheet of air can be allowed to enter, and be deflected above the heads of those in the room. Another good plan we lately saw was a long valve fitted in the head of a window inside, which can be closed or adjusted by a cord. On the outside, in the upper part of the window-frame, holes are drilled in a slanting direction, so that driving rain cannot enter, while the air is admitted, and is obliquely directed towards the ceiling by the aid of the valve. Glass louvres are upon the same principle, but are often draughty through the volume of air admitted. Sheringham's valve is another good adaptation of it, and Jennings's air-bricks, with sloped inlets to give the air an upward current, are well adapted for the purpose, and are used in barracks about 9in. above the floor level. Vertical pipes or flues built into the side walls form another admirable means of air inlet. We may mention Shillito and Shorland's vertical ventilating tubes. In churches a perforated pipe placed under the hookboards has been suggested as a means of supplying pure air at the breathing level. It could be warmed to 55° or 60°. We might say much upon the position of inlets; the natural currents and eddies of a room, the position of doors and fireplaces must be considered in selecting the best positions for them. For outlets the ceiling is undoubtedly the best, and the various air-extracting appliances that have been recently patented can be made to assist the upward draught in a pipe carried through the house with openings at the ceiling levels. Such ventilating arrangements as these may be made to an ordinary house for about £1 a room. We may here recommend Messrs. Barnard, Bishop, and Barnards' fire-grates (slow combustion), where the fire-trough is reduced in depth and the combustion is confined to the surface exposed to the room. To find the draught in a chimney flue the rule is: Multiply the column of air in flue by the difference of temperature between outside and inside, and divide by 491. The square root of the result multiplied by 8 gives the velocity of the upward current in feet per second.

Building Intelligence.

EDINBURGH.—A new church has been opened at Granton, in connection with the Church of Scotland. It is built by the Duke of Buccleuch, from designs by Messrs. Hardy and Wight, in the Early English style, to hold 350. The lancets are moulded, and the roof open, constructed with trusses resting partly on the walls, and partly on corbel pillars. The church contains a fine stained glass window, with representation of the "Parable of the Talents." This was erected as a tribute of respect to the memory of the late J. Hawkins, C.E., superintendent of works of Granton harbour. The cost was £2,000.

GLOUCESTER.—The Dean and Chapter of Gloucester at a recent meeting considered and approved plans prepared by Mr. Waller, their architect, for the reconstruction of the organ and the erection of a new screen. The screen will be almost a counterpart of the stall-work in the choir, with a canopied doorway in the centre. It will replace the present heavy modern stone division between nave and choir, and give the long-desired vista from end to end of the cathedral. The organ will be arranged in two divisions, occupying the easternmost arch on either side of nave, and the old cases will be re-erected on the aisle fronts, north and south of the new structure. The organ specification has been entrusted to Mr. Willis, of London.

GREAT CROSBY.—The Great Crosby schools for the Merchant Taylors' Company are situated on ten acres of land upon the high road from Liverpool to Southport. Close to the entrance gates is the lodge, the schools occupy the central part, and the masters' residence and garden the western extremity of the ground. Over the principal entrance is a handsome tower 16ft. square and 90ft. high, containing in the upper part a chamber for clock and bell. The clock face, 5ft. 3in. diameter, will be illuminated. The gable over the entrance itself is ornamented with carving, and the centre panel contains the arms of the Merchant Taylors' Company. The style is mediæval, executed in red brickwork, with dressings and ornaments of Stourton stone. The roofs are covered with banded green Westmoreland slates. The building is to accommodate 250 boys, and is arranged for enlargement to receive 400. The grounds are planted with a large variety of trees and shrubs, and are prepared for two cricket grounds, fives-courts, &c. The cost of the whole will be about £17,000. The architects are Messrs. Lockwood and Mawson, of London and Bradford; the principal contractor, Mr. T. Webster, Bootle, near Liverpool; Mr. W. R. Bennett was the clerk of works. The opening ceremony took place on Thursday, June 27, 1878.

LONDON SCHOOL BOARD.—At the meeting of this board on Wednesday the tender of Messrs. Atherton and Latta, of Chrisp-road, Poplar, was accepted at £5,886, for the erection of a school for 600 children in Dalgleish-street, Limehouse; the tender is at the low rate for a London school of £8 16s. 9d. per head for the actual building, and is the lowest of fifteen received. It was decided to erect a central correspondent's office for the Greenwich division at Tanner's-hill school, Deptford, at an estimated cost of £323. After a long discussion, and a division, it was decided to accede to the request of the National Health Society that the playgrounds attached to the board schools in Lower Chapman-street, Berner-street, and Old Castle-street—all in Whitechapel—should be opened to all children on Saturday afternoons and summer evenings, on payment of 5s. per week by the society for the necessary superintendence. The works committee were authorised to expend the following sums for supplying the necessary furniture and fittings to the undermentioned new schools respectively:—Hargrave-park-road (infants' department), £84 13s. 2d., 154 school places, 10s. 11d. per head; Randall-place, Roan-street, Greenwich, £608 10s. 8d., 763 school places, 15s. 11d. per head; Teesdale-street, Bethnal-green, £476 12s. 6d., 1,257 school places; Camberwell-road, (boys' and girls' departments), £371 1s. 6d., 360 school places, 20s. 8d. per head; and Stephen-street, Lisson-grove (enlargement), £371 6s., 436 school places, 17s. per head. It was explained that the wide differences in the cost per head arose from the furnishing or omission of infants' departments in which the outlay is much lower than in the other departments. The following new schools or enlargements will be opened immediately after the midsummer holidays:—Middle-row, Kensal-new-town; Marlborough-road, Chelsea; Caledonian-road; Hargrave-park-road (infants' department); Randall-place, Roan-street; Teesdale-street, Bethnal-green; Beresford-street, Walworth; Camberwell-road (boys' and girls' departments); Lyham-road, Brixton; Henrietta-street, Manchester-square; Stephen-street, Lisson-grove (enlargement of boys' and girls' departments); and Mary-street, Bromley by Bow (enlargement).

LIVERPOOL.—The Roman Catholic church in High Park-street, Toxteth-park, which has been in course of erection for the past two years, and is dedicattd to Our Lady of Mount Carmel, was opened on Saturday. The edifice, which was designed by Mr. O'Byrne, and has been erected at a cost of about £7,000, is in the Early Decorated style, the exterior being of red compressed brick, with Runcorn stone dressings. The dimensions are 110ft. by 60ft., and the church has seat accommodation for 850 persons. The internal walls are at present perfectly plain, but the pillars are composed of polished Aberdeen granite. The capitals have been carved by Mr. J. A. Hanley, of Chester, and the style may be characterised as a broad treatment of Early English adapted from Westminster Abbey and Llandaff Cathedral. The builders are Messrs. Roberts and Robinson.

MAGHULL.—The foundation stone of a new church, to be dedicated to St. Andrew, was recently laid at Maghull, near Ormskirk. It is being built in Early English style; the total length is 127ft. × 51ft. wide, exclusive of tower, and 45ft. high to apex of roof. The nave measures 69ft. × 24ft. 6in.; the north and south aisles each 69ft. × 10ft., and chancel 27ft. × 20ft. 6in. There are also organ chamber and chapel, each 15ft. × 14ft., and a vestry 13ft. square, and the foundations of tower, 21ft. square, are laid at west end. The church is being built of Yorkshire shoddy walling and Stourton stone dressings, the chancel being faced internally with white stone. Accommodation will be provided for 574 worshippers, the estimated cost, without tower and vestry, being £6,000. Mr. Jas. F. Doyle, of Liverpool, is the architect; Mr. Samuel Gunning, of the same town, the clerk of works; and Mr. James Leslie, of Miller's Bridge, Bootle, the contractor.

ROTHLEY.—The parish church of St. John the Baptist, Rothley, has been reopened after restoration. The architect was Mr. R. Reynolds Rowe, F.S.A., of Cambridge, the Ely diocesan surveyor. The tower masonry has been thoroughly repaired, and the battlements renewed in Ketton stone; the bells have been entirely rehung, new floors and a new roof provided. Two of the piers, and the bases of all the piers of the arcade between the nave and the north aisle were crushed. The clerestory wall has been shored up, and the defective masonry renewed in hard stone, upon huge masses of concrete. The roofs of the nave and the north aisle were entirely renewed and re-covered with lead. A new stone porch has been added on the north side. The chancel has been entirely rebuilt on the old foundations; the ancient windows and buttresses have been incorporated with the new work. The whole of the interior masonry has been restored, the walls replastered, and the windows newly glazed Mr. Charles W. Hunt was the clerk of the works.

RUGELEY.—A fortnight since the foundation stones of new public buildings at Rugeley were laid. The style is Geometric, or Middle Pointed Gothic. The materials to be used are best pressed red bricks, with Bath stone dressings; and for the roofs Whitland Abbey green slates, with crestings and finials of cast iron. The contract for the erection has been taken by Messrs. Dawson and Bradney, of Wolverhampton, at £7,000. Mr. W. L. Foulkes, of Birmingham, is the architect.

SEACOMBE.—A Presbyterian chapel was recently opened in Liscard-road, Seacombe, for the use of the Welsh population. The building is cruciform in plan, consisting of nave and transepts, with vestry and necessary lavatories and cloak-rooms, &c., at back. The accommodation at present is for 270 in the nave, to which may be added 120 who can sit in the transepts. Immediately over the intersection of the nave with transepts is a flèche rising above the roof about 20ft. The whole of the external masonry consists of limestone—that for the dressed portion being obtained from the Penmon quarries, near Beaumaris, Anglesea; and the shoddies or ashlars from Mrs. Foulkes's quarries at Graig, Denbigh. The gas pendants and iron hinges, &c., were supplied by Messrs. Jones and Willis, of Birmingham, from special designs supplied by the architect. Messrs. Hart, Son, and Peard and Co., of London, supplied the entrance gates, railings, &c. The porches are laid with Maw's tiles. The clerk of works was Mr. J. Jones, of Egremont, and the whole of the work was carried out under the superintendence of the architect, Mr. R. G. Thomas, of Menai-bridge.

SEVENOAKS.—On the 26th ult. the Right Hon. W. E. Forster, M.P., laid the foundation stone of the Institution for the Education of Daughters of Missionaries, which is intended for the reception of 100 girls of all ages and denominations. The silver trowel employed was presented by the architect, Mr. E. C. Robins, F.S.A., Adelphi. The design is in the Old English style. The building will be faced with red bricks (red Dumfries stone being used for the chief entrance only). The upper or third story will be faced with vertical tiling. Tiles will cover the roof, with wooden verge boards to the gables. The plan of the building is a parallelogram, with an open court in the centre, which, on the ground floor, is divided by the intervention of the dining hall. At the north end of the dining hall are the kitchen and domestic offices; on the south side is the chief entrance, on the right and left of which are the chief mistresses' and committee and reception rooms and library, forming the south side of the quadrangle. On the east side are the school and class rooms for the junior, and on the left side are the school and class rooms for the senior division of the school. A small infirmary is situated at the north-west angle, connected by a covered way with the main building. The laundry and fuel stores are situated on the north side of the kitchen court, which intervenes between them and the domestic offices, housekeeper's rooms, and cookery school. The upper floors are arranged for dormitories. The cost of the land, foundations, lodge, and fencing amounts to £5,000, and a further £10,000 is required to complete the building.

ST. ALBAN'S CATHEDRAL.—The scaffolding has very recently been removed from the north side of the nave of this building, and the beautiful proportions of the work of Abbot Trumpington in the clerestory arcade, recently restored, can be seen. Workmen are now fixing the stone groining of the south aisle of the nave, one side of which will rest against the wall that has been recently restored to a perpendicular position. It is now intended to proceed with the restoration of the Early English southern front, which, from the perishable nature of the Totternhoe stone employed in its construction, is in a sad state of decay. In the repairs a harder stone from Chilmark, near Salisbury, of the same colour, will be used. The levels of the floor will also undergo alteration, bringing them back to their original form. That of the great western porch will be lowered some 2ft. 6in., and immediately inside the great doors a noble flight of five steps extending all across nave and aisles will be fixed, forming a grand feature at the entrance. Where excavations have been made in the porch in order to find the ancient level, beautiful moulded bases of Purbeck marble have been discovered. They have been for centuries hidden beneath the comparatively modern pavement. These are the work of Abbot John de Cella, who died in 1214, and in future, of course, will be exposed to view. The Abbey Restoration Committee met at the Court-house, St. Alban's, a fortnight since, when it was determined to place a new high-pitched roof on the nave, extending

from the great western porch to the tower. This very great work, renewing the form which the roof presented during the first 400 years of its existence, up to about 1440, when the then Abbot (Whethamstede) lowered it to its present pitch, will require the exercise of a considerable amount of skill and caution. It is proposed to retain all parts of the old ceiling which can be preserved.

STRETTON SUGWAS.—A new church has been erected for the parish of Stretton Sugwas, and is to be consecrated on August 6. The building has been erected by Mr. James Bowers, of Hereford, from designs by Mr. W. Chick, the architect. The material of the walls is old red sandstone, and that of the window jambs and tracery, inferior arches, string-courses, plinths, &c., a yellowish oolite from the Ham Hill Quarries, Somersetshire. The whole of the material of the old church has been made use of; five of the fifteenth century windows have been inserted in the north aisle, and three Norman doorways do duty in the new church. The old timber tower, with its "black and white work," erected about the year 1672, has been taken down and re-erected on a massive stone base, 14ft. high. The nave and north aisle will be paved with Gregory's wood blocks. The chancel will be laid with Messrs. Godwin's tiles.

WOOLWICH. — The new chancel of St. Michael and All Angels' Church, Woolwich, which has been added to an iron temporary church, as the first section of a permanent building, was consecrated a fortnight since. The chancel is 50ft. in height, and has lofty clerestory and groined roof; the clerestory windows are a reproduction of the 13th century ones in Exeter Cathedral. Built in the main of brick, the dressings are of Bath stone, and the steep pitched roof is covered with red tiles. The internal walls are enriched with bands of coloured tiles. The lower portion of the reredos is finished, and is of Bath stone, with Devon marble slab and columns. The flooring is of Webb's tiles. The east and two side windows have been filled with stained glass by Mr. Drake, of Exeter, the subjects being the "Ministrations of Angels." The chancel seats 250 persons, and there are also a south chancel aisle, south-east vestry and base of tower, adjoining the lower part of which, opening into chancel, form the organ chamber. Mr. J. W. Walter was the architect, and Messrs. Kirk and Randall, of Woolwich, the builders. The gas fittings and cross were supplied by Messrs. Hart, Son, and Peard.

PARLIAMENTARY NOTES.

THE VENTILATION OF THE HOUSE OF LORDS.—In the House of Lords, on Monday last, Lord Granville adverted to the oppressive state of the atmosphere in the House of Lords on Thursday last during the great debate on the Eastern Question; and he asked the Lord Chancellor to use his influence with his colleagues to induce the Board of Works to improve the ventilation of the House. The Lord Chancellor sympathised with Lord Granville to a certain degree in the blame he had thrown on the ventilation of the House, and would endeavour to ascertain through the medium of the Board of Works whether any improvement could be made in its ventilation.

LEGAL INTELLIGENCE.

UNSTAMPED AGREEMENTS.—At a recent trial in a County Court held in the North Riding of Yorks, before Judge Turner, a joiner sued a School Board for £15, which was retained by the architect in his certificate for delaying the works, as fixed compensation for such delay. In the first place the joiner was nonsuited, because the agreement was insufficiently stamped—viz., it had on the face only one 6d. stamp for six contractors; therefore, before the plaintiff could proceed with his case, he had to pay £10 penalty, with £1 for expenses of stamping, &c. The memorandum of agreement required a 6d. stamp for each contractor's signature, besides the stamping of general conditions and plans. When the case was opened out, which occupied over 5 hours in hearing, after referring to a great many cases in point, &c., and the Judge, proving to the board's legal adviser that the board was held responsible for their architect as agent, the architect was unable to prove that the joiner completely stopped the works—therefore a verdict was given for the plaintiff with costs. But the costs did not include the penalty, because the joiner was not the first to sign across the stamps—therefore the agreement was null and void.

More than Fifty Thousand Replies and Letters on subjects of Universal Interest have appeared during the last ten years in the ENGLISH MECHANIC AND WORLD OF SCIENCE, most of them from the pens of the leading Scientific and Technical Authorities of the day. Thousands of original articles and scientific papers, and countless receipts and wrinkles embracing almost every subject on which it is possible to desire information have also appeared during the same period. The earliest and most accurate information respecting all new scientific discoveries and mechanical inventions is to be found in its pages, and its large circulation renders it the best medium for all advertisers who wish their announcements to be brought under the notice of manufacturers, mechanics, scientific workers, and amateurs. Price Twopence, of all booksellers and newsvenders. Post-free 2½d. Office: 31, Tavistock-street, Covent-garden, W.C.

TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.]

All letters should be addressed to the EDITOR, 31, TAVISTOCK-STREET, COVENT-GARDEN, W.C.

TO OUR READERS.—We shall feel obliged to any of our readers who will favour us with brief notes of works contemplated or in progress in the provinces.

Cheques and Post-office Orders to be made payable to F. PASSMORE EDWARDS.

ADVERTISEMENT CHARGES.

The charge for advertisements is 6d. per line of eight words (the first line counting as two). No advertisement inserted for less than half-a-crown. Special terms for series of more than six insertions can be ascertained on application to the Publisher.

Front Page Advertisements and Paragraph Advertisements 1s. per line. No front page or paragraph Advertisement inserted for less than 5s.

Advertisements for the current week must reach the office not later than 5 p.m. on Thursday.

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N.B.—American and Belgian subscribers are requested to remit their subscriptions by International P.O.O., and to advise the publisher of the date and amount of their remittance. If the last-mentioned precaution is omitted, some difficulty is very likely to arise in obtaining the amount. Back numbers can only be sent at the rate of 7d. each, the postage charged being 3d. per copy. All foreign subscriptions, unaccompanied by an additional remittance to cover the extra cost of forwarding back numbers, are commenced from the next number published after the receipt of the subscription.

Cases for binding the half-yearly volumes, 2s. each.

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O. B. (We refer "O. B." to "Hunt's Law of Boundaries and Fences." Consent must be first obtained of adjoining owner. Under the Building Act a "building owner" has to give three months' notice of his intention.)

ERRATUM.—In article, in last number, on "Chapter Houses," for "Ceverham" read "Cockersand."

Correspondence.

MIDDLE-CLASS COTTAGE RESIDENCES.

To the Editor of the BUILDING NEWS.

SIR,—In glancing over the sketch for above in your last week's issue, I note a few points which I should like information upon:—1. Are the chimneys constructed of brick or of concrete slabs? 2. If of the former, as they appear to be in the sketch, what foundation have the two end stalks (where, by-the-bye, six flues are shown in lieu of five)? 3. Are the windows flush on the outside as shown in the elevation (more particularly that of the mission church), or do they project as shown on the plans?—I am, &c., "CONCRETE SLAB."

BODMIN TOWN HALL.

SIR,—As a constant reader of the BUILDING NEWS, and a resident of Bodmin, I was interested in the remarks relative to the above in your last issue. With your permission I will explain, knowing, as I do, the whole circumstances of the case, that Mr. Trevail was not so much to blame as has been represented. Happening to be passing through the town on other business he was correctly informed that the plans had been open to public inspection, and very naturally expressed a wish to see them, as, I take it, would be accorded to any one now visiting Yarmouth, where designs for the new town buildings are under inspection. The person whose name has been associated with his merely performed the function of opening the door, and the inspection lasted about five minutes without comment of any kind. I am quite sure that other competitors in the town or locality would have had similar facilities, and, as the plans were under motto, we may reasonably suppose, from the numbers who saw them, that some did so.

The selection of Mr. Trevail's design is easily accounted for, as it was the only one with a "ground-floor" arrangement for the large hall and the council chamber, with the municipal offices comprised in the existing building, or that was likely to be carried out within the proposed outlay—points which must have been vital in any selection. I write this in the interests of fairness to all parties.—I am, &c.,

AN OUTSIDER.

MANCHESTER SOCIETY OF ARCHITECTS TRAVELLING STUDENTSHIP.

DEAR SIR,—I can quite understand that a little disappointment will be felt by the unsuccessful competitors in the above: this is but natural.

All the competitors who stated that additional time would be of service to them were allowed to retain their drawings until the time fixed for the meeting of the committee of the society. The society met on July 1st, and confirmed the report of the committee, awarding the studentship to Mr. Horsfield, and on July 2nd the following letter was sent to each of the competitors the full report of the committee being also published in the *British Architect*, in the issue of July 5th.

It is the desire of the Society of Architects, as much as possible, to further the interests of the students, and I think an apology is due to it from your correspondent for his extremely unjust letter. I think he will find very few who will agree with his sweeping charge against it, and I hope *not many* who will endorse that portion which reflects on—Yours, &c., JNO. HOLDEN, Hon. Sec. M.S.A.

July 22nd, 1878.

[*Copy.*]

TRAVELLING STUDENTSHIP.

DEAR SIR,—I am requested by the Council of our Society to inform you that the travelling studentship for this year has been awarded to Mr. J. N. Horsfield. They, at the same time, desire me to express their satisfaction with the drawings submitted by you in the preliminary competition, and which have evidently been prepared with much care. Should the studentship be repeated another year, they hope that your name will be again found amongst the competitors.—I am, &c.,

July 2, 1878. JNO. HOLDEN, Hon. Sec.

The Cork Town Council, at their last meeting, appointed Mr. Cotton, C.E., to report on the drainage of the city, and also on the pollution of the River Lee, at a fee of five guineas a day. At the same meeting one hundred guineas were voted to Mr. Walker, the city surveyor, as an honorarium for services rendered in connection with the Artisans' Dwellings Act improvement scheme about to be carried out at a cost of £50,000.

A new Wesleyan chapel is about to be built at Askern, West Riding. It will be constructed of brick, with stone facings, and will cost £1,500. Messrs. Perry and Co., of Castleford, are the builders.

The Preston Corporation have accepted five tenders from Messrs. S. B. Wilding and Sons, and one from Messrs. Parker and Ingram, being the lowest received, for painting the exteriors of the several properties belonging to the town.

Memorial stones of a new chapel for the United Free Methodists were laid at Retford last week. The building is to be erected on the site of the present one in Union-street; it will seat 600 persons, and will cost £1,600. Mr. John Allsopp, of Worksop, is the architect, and Mr. Jonathan Fish, of Retford, the contractor.

Mr. Holman Hunt has returned to London after a long residence in Palestine.

The memorial stone of a new schoolroom, to be built in connection with the Baptist Chapel in New London-road, Chelmsford, was laid on Tuesday week. The Rev. S. K. Bland, of Beccles, Suffolk, is the architect.

St. Thomas's Church, Gawber, was reopened last week after restoration, under the care of Messrs. Dixon and Moxon, architects, of Barnsley.

A new lecture on "Life, Health, and Disease" was delivered at the Polytechnic by Mr. J. H. Pepper, for the first time, on Wednesday evening. Dr. B. W. Richardson presided, and at the close expressed his gratification that this institution had at length attempted to instruct as well as amuse; he trusted that this new departure marked the commencement of useful work in popularising sanitary science.

Intercommunication.

QUESTIONS.

[5439.]—**Smoke Prevention at Brick-kilns.**—How can smoke be prevented or reduced from brick-burning in oblong open-fire down-draught kilns, so as not to be a nuisance to neighbouring houses? Is there any contrivance for this purpose, or are there any special instructions to be given to the men who manage the kilns?—P. W.

[5440.]—**Peter Harrison.**—Can any of the readers of the BUILDING NEWS assist me to information in regard to the life and works of Peter Harrison, architect? He came to America and settled at Newport, R.I., where he erected many fine edifices, both public and private. His works are Classic in design, well planned, and remarkably pure in detail. Among others may be mentioned the Redwood Library, State House, and City Hall. He married and became collector of this port, and also of the port of New Haven, where he died in 1775. Tradition asserts that he was an assistant to Sir John Vanbrugh in the building of Blenheim Palace. But little is known in America in regard to his early life, and I am desirous to collect what facts are still to be obtained. If he were at any time connected with the works at Blenheim, perhaps some member of the old Vanbrugh Club can assist me.—G. C. M. J., U.S., Newport, R.I.

[5441.]—**Dilapidations.**—At the end of a seven years' lease, containing the usual clause to paint inside during the term, can the landlord charge for graining and varnishing also? And, supposing the tenant has not painted, but left the old grained work merely cleaned and varnished, is the landlord to charge for painting only, and have the graining thus put out? Or does the fact of work being originally "grained" take it out of the meaning of parts usually "painted," and thus prevent the tenant from touching it?—KILBURN.

[5442.]—**St. Magnus' Cathedral, Kirkwall, Orkney.**—Can any of your readers kindly inform me as to whether measured drawings of this building have been published?—CARAMEL.

[5443.]—**Swiss Cottages.**—Having bought a small plot of land in a pleasant and romantic locality, I wish to put up a few neat Swiss cottages, to rent £20 to £40 per annum. Where shall I find some suitable designs?—C. B.

[5444.]—**Proportion.**—Will some reader kindly inform me the best method of studying proportion in architecture?—STUDENT.

[5445.]—**Sketching.**—Will some reader kindly give me a few hints on sketching—for instance, the interior of a church, also exterior views of the same?—STUDENT.

[5446.]—**Fire-resisting Stones.**—I notice, in your issue of the 6th inst., that under the heading, "Protection of Life from Fire," Mr. Trickett says we should not use "soft limestone" for staircases, by which I presume he means "Portland." He would greatly benefit ourselves and a number of your readers if he would give the names of the stones which *will* stand fire. We are continually being asked this question, and one client we told that "solid oak" steps were the best "stone" in the world, and we used it, and he paid for it; but, still, the question is a serious one, and the information Mr. Trickett could give would be valuable to all in the trade.—BUILDERS.

[5447.]—**Crete Enamelling.**—What is it, and the cost? Is it better than distemper?—A. Z.

[5448.]—**Stain and Wax Floors.**—What is the best mode of treating white deal floors with stain and bees-wax?—A. Z.

[5449.]—**Cardinal Points.**—Can any of your surveying readers explain the meaning of the cardinal points of the compass in the theodolite being reversed on the instrument?—PLAIN THEODOLITE 6in.

[5450.]—**Copying Apparatus.**—Information with regard to the above will oblige. To obviate the expense of lithography, I want a serviceable and effective apparatus which will give about half a dozen copies of quantities, &c., from one written copy.—E. T.

[5451.]—**Tapering of High Columns or Shafts.**—What rules are usually adopted for this purpose? Take, for example, the Duke of York's Column or Eddystone Lighthouse. The idea is to follow out the outline of the bole of an oak—not a regular taper from bottom to top. Any information will be gladly received by a—STUDENT.

[5452.]—**Cement Slab Cottages.**—I shall be obliged to know at what cost this class of building, described in your last issue, can be erected; if estimates are prepared by the patentee, also how the ornamental timbering is formed and fixed? Is not a plinth or wall necessary to rest the studs? I do not quite understand how the inside slabs are finished at the joints.—ENQUIRER.

[5453.]—**Old St. Paul's.**—Is there any authenticated plan published of the old cathedral showing the dimensions and position of the cloisters and chapter-house?—ARCHÆOLOGY.

[5454.]—**Proportion of Column.**—What is considered to be the right proportion and entasis for an Ionic (Roman) column, and is it necessary in brick pilasters to give a swelling? I find some of the Queen Anne revivalists ignore altogether the proportions generally used.—PHILOS.

[5455.]—**Garth and Chevet.**—I shall be glad for the following information:—What is the origin of the term "garth" applied to a cloister; also if any reader of the BUILDING NEWS would kindly give a list of a few chevets noted for any peculiarity of plan or design?—STUDENT.

REPLIES.

[5426.]—**Consecration Crosses.**—There is a consecration cross on the south side of Exeter Cathedral—a floriated Greek cross.—M.

[5426.]—**Consecration Crosses.**—In reply to the above query I have extracted the following from the *Penny Post*, page 82, 1872:—"There are consecration crosses in the chapel of Leycester's Hospital, Warwick. The chapel is over the west gateway of the town, and is dedicated to St. James. Ten dedication crosses remain at Moorlinch Church, Somersetshire. Other examples are on the external walls of Salisbury Cathedral, Edendon Church, Wilts; Cannington Church, Somerset; Brent Pelham Church, Herts; in one of the piers of St. Mary's, New Shoreham, Sussex; and on the north and west walls of Amberley Church, in the same county. There is a very ancient example of dedication or consecration cross on the base of the old round tower of Brechin Cathedral, in Scotland."—C. F. W.

[5430.]—**Heat Through Walls.**—Fill the cavity with powdered chalk and silicate cotton (slag wool). These are both non-conductors of heat.—H. SORBY.

[5431.]—**Keeping Down a Spring of Water.**—The best preventive against water breaking through such a floor as "Perplexed" mentions, would be to line the sides and bottom of the chamber with flanged cast-iron plates, bolted together, and joints staunched with red lead putty. In fact it would be bedding a cistern inside walls. It would be necessary to have the sides of cistern higher than water line, and any space between plates and masonry can be made good with Portland cement. I have seen water spring through 12in. thick concrete flooring.—MICHL. HAWNEY.

[5435.]—**Winchester Cathedral.**—If "Architect's Pupil" applies to Mr. John Colson, F.R.I.B.A., architect to the Dean and Chapter of Winchester Cathedral, he would doubtless obtain the permission he seeks. To make sketches of St. Cross write to the authorities of the hospital. I have sketched at both places, and had no difficulty in doing so.—G. H. G.

[5437.]—**Professional Charges.**—"Beta" does not explain in what relation he stands to the board, or whether any agreement, written or implied, exists. For the small contract mentioned the ordinary £5 per cent. is quite inadequate, and "Beta" ought to charge his time and expenses. He is certainly justified in taking a higher charge on the second contract, if he is not bound by any agreement with the board. The customary practice is to make an agreement with the board for such services, and in absence of this to charge for time.—SURVEYOR.

[5438.]—**Lights.**—To secure the old light to the adjoining property, there is a rule to the effect that the new building should be set back such a distance that the old window shall receive all the light above the angle of 45°. But the decision of the courts have been made irrespective of any rule, and an adjoining builder can be restrained from erecting any building so as to darken or obstruct the free access of light to the ancient windows enjoyed previously. If "A. T. T." will explain in detail the circumstances of his case, a more definite answer may be given.—G.

VERITY BROTHERS.

Patent Ventilator or Air-Propeller, for the introduction of Cold or Warm Air into Dwellings, &c.

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The apparatus consists of a drum with a double set of fans, which are worked by a fly-wheel placed in the centre, and on the same axle as fans. The motive for this fly-wheel is arrived at by a small jet of water being directed on to it, causing both the wheel and fans to revolve with great velocity, the air passing through the machine at a rate equal to 2,500 feet per minute, if desired, according to size of apparatus.

N.B.—The above Machine may be used either as an exhauster or injector, as may be preferred, or both objects combined.

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Designers and Manufacturers of Lamps and Candelabra.

Office and Works, 155, Queen's-road, Bayswater, W. [ADVT.]

WATER SUPPLY AND SANITARY MATTERS.

SANITARY PROGRESS IN BIRMINGHAM.—The report of Dr. Hill, medical officer of health for Birmingham for the year 1877, shows that improvement is continuing to be made in the sanitary state of the borough. House construction has, Dr. Hill says, made under the bye-laws adopted in 1876, for regulating the construction of new streets and new buildings within the borough, considerable advances, foremost among which is the abolition of the back-to-back system. The provision of more space around the dwelling is another great improvement, but drainage has not yet received sufficient attention. So badly, as a rule, are drains constructed in Birmingham that they fail even to carry off slops, and entail the further evil of bringing into houses the dangerous gases from the sewers, or those engendered within the drains themselves. The leading defects of a common drain are that it has no trap, or the trap is upon such a bad principle that it allows drain air to come out of the drain and prevents liquids from going into it; this is especially so with the common bell-trap. If it be of brickwork the masonry is often badly constructed, and allows leakage into the soil, so as to contaminate air and water; and if it consists of so-called sanitary pipes, the numerous inevitable joints are left without lute or puddle, and afford as many points of exit for both liquids and gases, occasioning dampness and impurity of soil and walls and floors. This is the simplest case, such as is commonly presented by small-house property; a consideration of the defects in better class property, where the luxuries of sinks, bathroom, lavatory, and w.c. are indulged in, would reveal still more prolific sources of danger. In the laying of external drains, Dr. Hill is more than ever convinced that the work should be subject in every case to supervision by a competent corporation officer, a step necessary to guard against the indifference and ignorance, and in some cases the carelessness, if not dishonesty, of the persons concerned. The question involves the purity or impurity of the soil over the whole town, and the condition of the soil is one affecting the general tone of the public health. The action the Corporation is taking to abolish ashpits, dumb wells, and other surface nuisances, will not be complete until the surface drainage is also dealt with. It is satisfactory to learn from the annual averages tabulated in the report that the character of the water supply exhibits a progressive improvement; during 1877 366 private wells were closed as being polluted. In the same period six miles of sewers were constructed in streets taken to by the Corporation, and three miles in streets not taken to, and this extension of sewering is still being continued. The abolition of the noisome and dangerous ashpits is being rapidly effected, and the privies attached to them are in process of conversion into pan closets. The number of pans introduced during the year is 6,648; the total number introduced being at the end of the year, 22,668. The paving of the roads and footpaths has been very considerably extended, and constitutes a great and much-needed improvement. At the end of the year the length of streets in the borough was 193¾ miles; of which 151 miles had been taken to by the Corporation. In the former and through private lands the sewers measured about 129 miles, in streets not taken up, 35 miles. Ten miles of the carriage ways are paved, while two miles on tramway routes are partly paved and partly macadamised.

Helliwell's Patent System

Of AIR and WATER-TIGHT GLAZING, WITHOUT PUTTY, and without exposing any outside woodwork to paint, and NEW SYSTEM of COVERING ROOFS.

The fasteners are brass or copper. The peculiar arrangement of the glass covers the whole of the woodwork, and only the small fastener is visible; therefore the roof is indestructible, and outside painting unnecessary. The squares of glass can be easily removed, and the whole taken out and cleaned by any inexperienced person. Breakage is impossible except through carelessness or accident.

The glazing is more air-tight than the old putty system, yet any amount of ventilation can be given.

Old roofs may be re-glazed on this principle, and roofs are covered with slates or zinc on this system.

Extract from BUILDING NEWS: "Mr. T.W. Helliwell, of Brighouse, has recently patented and introduced a new system of glazing and covering roofs, which is certainly superior to anything of the kind we have seen before . . . . and it will, in our opinion, supersede any other system before the public."

Important references and all particulars from the patentee, T. W. HELLIWELL, Brighouse, Yorkshire; and 19, Parliament-street, London.—[ADVT.]

Our Office Table.

WE regret to record the sudden death, which took place last Monday at Hampton Court, of Mr. W. Wyke Smith, solicitor to the Metropolitan Board of Works, of angina pectoris. The deceased was engaged previous to 1861 by the Commissioners of Sewers, and since that date has held the appointment which death has now left vacant. He was much respected and well known by a large class of architects in London, and has on many occasions been of considerable service to the Board of Works. We hear from his assistant, Mr. Napier, that he appeared in usually good health on Saturday last when he attended at his office. Mr. Smith was in his 70th year.

RYE church, as most readers know, is to be restored. The *Athenæum* protests, as usual, because the building is "the cynosure of an ancient town"—whatever that may be. "Mr. Street," it is declared, "may readily produce a more beautiful building than the ancient structure at Rye, but not even his genius and learning can endow a new church with that grace of time's bestowing which clothes the ancient walls, piers, pillars, windows, and doorways. To remove the old pews and replace them by stalls will by no means add to the comfort of the parishioners, or to the profitableness of the sermons delivered from the fine and characteristic pulpit, which has been good enough for six generations of townsmen and their pastors, and is a capital example of its kind. A smartly restored church, standing among the old tombstones in the profoundly impressive graveyard, must needs to be out of keeping, unless it is intended to 'restore' the tombs, or abolish them altogether. It does not seem that there is the sligtest need for the proposed operations at Rye, and it is to be hoped that funds may not be forthcoming for this transmogrification. If it is really needful to repair any part of the structure, that would be better done by an engineer than by architects."

THE Surveyor of the Poplar District, Mr. Robert Parker, has introduced a new system of ventilating and purifying sewers, which has been lately referred to the Metropolitan Board of Works. The board referred the matter to their engineer, Sir Joseph Bazalgette, to report upon, and some experiments were undertaken by the officers of the board, the result of which was satisfactory. Mr. Parker's system may be described as a combination of the ventilating shaft and cowl inlet, by which means fresh air is forced into the sewer and drains, and mixes with the foul air, rendering it innocuous before it escapes at the outlets of the rain-water pipes or untrapped sinks. Mr. Parker fixes ventilating shafts, about 9in. diameter, with reversible cowls, so fixed as to force wind into the sewers and house drains. He also places ventilating pipes above the house drains at the rear of houses, and continues them to the roofs; the soil-pipes are proposed to be ventilated by ¾in. pipes, carried up as near to the closet pans as possible. When the sewers are surcharged, or the fluctuation of sewage is great, smaller shafts at convenient positions are recommended, to convey the foul gases to the higher levels. Mr. Parker shows how the system can be applied to houses drained by a system of back drainage, in which a block of houses is connected by one drain. This he does by erecting at the end of such main drain a shaft with reversible cowl, so as to force the wind into the sewer and house drains. The draught or current is proposed to be regulated by a flap trap at the outlet of the drain, with an aperture in it 3in. in diameter. By this means the air would be forced into the sewer, and a portion would pass through the ventilating pipes at the rear of the houses. We can recommend the plan proposed by Mr. Parker, in those cases especially where the houses are combined, and no proper system of disconnection between sewers and house drains exists.

THE committee of the Liverpool Art Club propose to open an exhibition of the works of Josiah Wedgwood during the next session. To make this exhibition a useful representation of Wedgwood's productions it has been thought advisable, so far as it is possible, to exhibit the specimens in the order in which they are described by Wedgwood himself in the various editions of his "Catalogue." A committee, consisting of Messrs. William Bartlett, A. H. Brodrick, Charles T. Gatty, and T. Shadford Walker, has been appointed to carry out this plan, and they will feel much obliged if those who are collectors or possessors of old Wedgwood ware would give them some general description of the works they possess, and which they would be willing to exhibit. Communications may be addressed to Mr. C. T. Gatty, at the Art Club, Myrtle-street, Liverpool, who is compiling the "Catalogue," and will gladly give any further information.

THE thirty-first annual meeting of the Builders' Benevolent Institution was held on Thursday, at Willis's Rooms, St. James's; Mr. Dines in the chair, in the absence of Mr. Wm. Higgs, the president. The annual report (read by the Secretary, Major Brutton) congratulated the subscribers to the institution on the fact that although the past year had been one of almost general adversity in trade, the income of the institution had not been diminished. This was especially gratifying, in view of the recent increase in the amount of the annuities to pensioners. Six pensioners had been elected during the past year, and by the new rule, one widow of a pensioner had been placed on the list of annuitants without election. It was a source of much gratification to the committee that they were enabled to recommend that all the candidates (three) presenting themselves in May last should be placed on the funds of the institution without the trouble and expense of canvassing. The institution was very much indebted to its president during the past year (Mr. William Higgs). The balance-sheet showed that the total receipts for the year were £2,445 2s. 2d., and the expenditure (including the purchase of £209 3 per cent. consols) to £1,773 7s. 11d., leaving a balance of £671 14s. 3d. in the hands of the bankers. The report and balance-sheet having been adopted, votes of thanks were accorded to the president, treasurer, trustees, committee, and other officers of the institution. Mr. Plucknett was re-elected treasurer, Mr. Keeble was asked, and consented, to undertake the duties of hon. sec. to the annual ball; and Mr. Edward Conder was unanimously elected president for the ensuing year. It was announced that the annual dinner had been fixed for Thursday, Nov. 7th next, at the Freemasons' Tavern.

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TENDERS.

BOURNEMOUTH.—For pulling down old buildings and erecting three shops in the Commercial-road, Bournemouth, Hants, for Messrs. Clark. Messrs. Kemp-Welch and Pinner, architects; quantities supplied:—

		Allow for old building.
James	£5,273 12 2	£90
Jeans	5,325 0 0	210
Pike	5,137 0 0	110
Stroud	5,091 0 0	120
Hoare and Co.	5,200 0 0	250
Jones and Son	5,050 0 0	100
Jenkins and Son	5,050 0 0	150
Huey	4,880 0 0	—
Watts and Ellison	4,779 6 0	130
Hammerton & Co.	4,780 0 0	250
Minty (accepted)	4,510 0 0	190
	£5,183 12 2	
	5,115 0 0	
	5,027 0 0	
	4,971 0 0	
	4,950 0 0	
	4,950 0 0	
	4,900 0 0	
	4,880 0 0	
	4,649 6 0	
	4,530 0 0	
	4,320 0 0	

CAMBERWELL.—For the erection of Sunday schools for Denmark-place Chapel, Cold Harbour-lane. Mr. Herbert D. Appleton, architect; quantities supplied by Messrs. Corderoy and Sandull:—

Huydon	£3,087
Thompson	2,924
Ansell	2,874
Downs, W.	2,733
Tarrant and Sons	2,644
Hawkins	2,560
Hook and Oldrey	2,498
Riggs and Hill	2,490

CAMBERWELL.—For alterations and additions to Grove Chapel, Camberwell. Mr. Alfred R. Pite, architect, Bloomsbury-square:—

Allen and Son, Finsbury	£1,690
Turner and Son, Aldgate	1,500
Smith, Norwood	1,396
Falkner, New Kent-road (accepted)	1,285

CAMBRIDGE.—For north block of buildings for the Governors of the Leys Schools, Cambridge. Mr. Robert Curwen, architect, Liverpool; quantities by Mr. J. S. Alder, London:—

Stephens and Bastow, Bristol	£9,699
Roberts, L. H. and R.	9,558
Brass	9,480
Dove Bros.	9,350
Pattinson, S. and W. (accepted)	9,200

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THE BUILDING NEWS.

LONDON, FRIDAY, AUGUST 2, 1878.

THE ESCORIAL.

DISMAY, unexampled, has been created throughout Spain by the official announcement that this unique Palace and Temple of Spanish pride is to be, in a manner, dismantled, and converted into a Gallery of Art rather than a Tomb. A technical objection to the burial of the young Queen Mercedes may have influenced the Royal decision, but it is none the less peremptory on that account; and, in fact, the Escorial is a structure of whose tradition, as they stand, any Spanish Sovereign might well wish to be rid, more especially one to whose dead wife it refused a grave. It may, possibly, be in consequence of this that a Royal decree has gone forth, transforming the gloomy edifice into a centre of holiday resort and home of pictures and sculpture, from a solitude, of Art, indeed, yet one which was little more than a melancholy reminiscence for Spain. The guide-books—even the best of them—give but an insufficient idea of that lonely, magnificent, long-walled, and high-roofed edifice, which seems like a part of the mountains amid which it stands. The Spanish architects, with all their love of tradition, can scarcely keep it intact: rain drops through the Saracen roof, and wet disfigures the Arabian floors. Yet this was the Eighth Wonder of the World. Thirty-eight years ago the entire edifice was in danger of perishing entirely out of sight, when a public subscription saved it; but, even since then, revolutions have stripped it of many treasures, and now, except for the intervention of the Government at Madrid, with a reasonable purpose, it would be condemned to final ruin. As to the traditions, they are, like most traditions, faulty in the extreme. The structure is not a palace, or convent, or a tomb, but all three combined, and its name may as well be derived from a group of rocks, a cluster of scrub oaks, or a weed, as from the traditional gridiron of the ultra-Catholic Saint. Moreover, the history is altogether uncertain which ascribes the building of the edifice to the second Philip, after the victory of St. Quentin. Modern investigations have demonstrated monastic relics of a far earlier date. The broiling work had been done, if legend may be believed, long before the architectural gridiron was constructed. But, as its history is coming now into question, and may rise into importance before long, as substituting a grand picture-gallery of Spain for a sepulchre, some little notice may be worth bestowing upon the great shrine of the dead, built over the site of a Pagan temple. Its first stone was laid, it is said, April 23, A.D. 1563, by Juan Baptista de Toledo, "whose great pupil," says the controversial authority, "Juan de Herrera, finished the pile September 13th, 1584," though for neither of these statements have we any absolute warrant whatever. It is not even certain that the Escorial was either designed or erected by Spanish architects—or, still less, by French architects—at all, while the Moorish genius was still in the enjoyment of its full glory throughout Southern Europe. The Escorial, it is true, has not the Saracenic character: it is not a multitude of green-painted copper-vaulted domes; but it is a tomb, though it was intended to be a palace. Nobody knows who erected it. The King of Spain himself could not tell. A French hodman, Louis Foix, once claimed the credit as his own. Colemenar, Moreri, and Voltaire, all asserted the design as having originated with France. To whom, however, the design is due, it was not a happy one; and the man, half king, half monk, who inhabited the mighty convent during fourteen years, could have felt little more glorious beneath its roof than if he had been an Indian fakir. Still, the Escorial, associated as it has been, through nearly the last three hundred years, with the arts of Spain, is, under all circumstances, a centre of European interest, though not, like the Alhambra, celebrated on account of its architectural and artistic wonders. Those who see it from the neighbouring hills, are, at a first glance, undoubtedly disappointed. They have come, probably, from the ruins of the Acropolis, or the relics, even, of Dax, in Southern France, and they find little, in the huge Spanish structure, which satisfies any antiquarian or artistic sentiment. The building is a vast uprearing of cool, grey, granite; its roof is blue-slated, with leaden pipes and gutters; it might be a manufactory, a prison, or an asylum for lunatics, for all that the outward appearances show. But the whole configuration of the place is a denial of its vulgar traditions. There are no eleven thousand windows, any more than there are eleven thousand chambers at the Vatican, or were Virgins at Cologne; what orifices exist in the heavy walls "resemble a ship's port-holes, and might be real embrasures for cannon"—unplanned for the gigantic structure they were intended to illuminate—"bits of bigotry," as the writer of the Imperial Philip declared, and altogether degrading to an architect.

There is no such other building in the world, and we doubt whether it can ever, even as a picture-gallery, be made humanly enjoyable. Viewed from a distance, it looks, as it has been described, like a palace of death. The interior is even more gloomy—744 feet from south to north; 580 from east to west—partially Doric in style; gridiron, with a little addition of fancy, in shape; towered at the four corners, platformed in front, and terraced, with fishponds on the upper and under slopes; three thousand sq. feet in area, and, as the guides are never tired of reiterating, within the centre, the chapel surmounted by a dome; sixty-three fountains, twelve cloisters, eighty staircases, sixteen court-yards, and three thousand feet of painted fresco, "exceedingly magnifical of fame and glory through all countries." So far, the guides. We are left to better instructors when the grand interior is reached. There is nothing to view, except corruption and hideousness, in the Hall of Dead Kings, and little better in the Vestibule of Sovereigns, with its statues of the Kings of Judah, each seventeen feet high, all cut up, the keepers of the triple structure say, from a single granite block, with hands and heads of marble, crowns of gilded bronze, and figures resembling, in all except their leanness, those of the Caryatides. In the great court, the stranger is confronted, and, it may be said, confounded, by a vastness and magnificence nowhere else to be exemplified in the world—not even in the palace regions of Agra, Benares, and Delhi. For, a parallelogram opens upon him—320 feet long, by 120 feet less wide, marbled, colonnaded, cloistered, partly white, partly coloured, some of it cloistered, some of it mosaicised—all intensified in the highest sense and meaning of architectural beauty. There are, in this open space, no fewer than 275 windows—a barbaric waste of adornment, not giving a proportionate degree of light, because the whole design of the edifice is one of shadow. Nevertheless, something like a splendour is thrown upon the entire group of palaces, or temples, or monasteries, or whatever they may have been intended to represent, by the grand Arabic flat roof, the half-hidden choir, the cavern-like arches, and the perfect distinction of the mighty edifice from all other monuments approaching it in glory between the West and the East, the North and the South, of Europe. The eye is first attracted, not by ornament, but by the absence of it—no gold and purple Virgins, no blue and gilded Infants—all simple and solemn; but so far away from the present life of Spain that little wonder is left when its reigning King determines that the Escorial shall be, not tomb, or convent, or oratorio, but a bright and monumental Gallery of Art. Already it is so, in a particular and special sense. The chapel, in itself, is of more than Roman magnitude—320ft. long, 250ft. wide, and 320ft. up to the top of the cupola, the warning and the stigma over-crowning all, that "God alone is great!" Unlike the Alhambra, the Escorial was never devoted to other than a Christian purpose. For in it there was no "last of the Abencerrages;" it has been, from its foundation, a Christian palace, temple, and sepulchre, and is now to be the Vatican of Spain. Yet, long ago, and since its existence, it has enclosed a world of art, with the red-veined steps of its high altar, its jasper columns, gold and bronzed based; its Cangiaqui frescoes, and its senseless San Lorenzo on the gridiron. Never was so lofty a Christian shrine thus wantonly degraded—with its gigantic saints and its martyrs; its brass medallions and pasteboard rood; its wooden tabernacle and its gilded effigies of kings. The reigning monarch of Spain, according to the decree, intends, however, to respect the ancient art conserved in the chambers and corridors of the Escorial, while dedicating them to a more exact and distinctive purpose in connection with the arts for which the Spanish genius has so long and so superbly been celebrated. The bronze-gilt figures in the oratories will not be removed, or in any way disturbed; the painted effigies will still kneel at their grotesque altars, and the profane epitaphs of former Spanish monarchs are to remain, unashamed of the dust by which they are rebuked; while, again, "the statues which are portraits," will not be displaced; but there is abundance of room for the royal pleasure, even though the works of Giacomo Trazzo, Lucca Giordano, and Pelegrino Tibaldi are superseded with those—the bronze medallions, the holy rood, and the fifteen gilt statues of Pompeio Leone—not to mention the Saviour on the column, and bearing the Cross, and the Ascension of the Virgin, by Z. Zuccaro. We have here the nucleus of a magnificent Spanish National Gallery, glowing with Spanish art from the days when Spanish art was in its zenith, at its climax, and, indeed, in its perfection. Already, as we have said, those who have visited the Escorial must have recognised on its walls the masterpieces of historical portrait-painting. Assuredly, we have never admired, in the much-boasted Bavarian galleries, portraits equal to those of Philip II., the mother of Philip III., and Don Carlos, comparatively modern though they are. There are fifty inferior altars in the Escorial, each surmounted by a picture, which is not invariably a portrait, and archæologically interesting as illustrations of armour and costume. Besides these, we have reckoned over the canopies of Navarette the Dumb, who "spoke with his pencil," the Spanish Rubens, the Zuccaroi, the Sanchez, and the Tibaldji. It is to be marvelled at, however, how the young King of Spain can imagine himself as possessing a power to contradict all the traditions of his ancestors by transfiguring, as it were, this triple shrine into a sort of commonplace picture and sculpture gallery, when its principal traditions are so kingly, historical, or sacred. The Relicario itself must be removed before the building can be secularised—11 whole bodies, 300 heads

—"Hunter," says Murray, "never founded a finer anatomical museum." A thousand other points might be polished in this light, but they are scarcely worth keeping in sight. The interest, for the living generation, consists in the future destination of the Escorial, as decreed, in his bereavement, by the young King of Spain. We have to remember that the Spanish monarchs possess absolute authority in these matters. Philip II. "kept these precious relics in 515 shrines of Cellini-like plate, some wrought by Juan D'Arfé, but La Houssaye took all the bullion, and left the relics on the floor. These, when he departed, the monks collected in baskets, but, in the confusion, many of the labels got undocketed, so that," &c. But, in all this splendid pillage, there were sacred images and vessels of silver and of gold, with other wonderful works in the precious metals; yet with these the world of to-day has little enough to do; it descends, indeed, into the Royal Tomb, and finds nothing there beyond royal tombs, chamber-houses of death, gorgeous and ghastly with Spanish marble, gilt, and the customary Golgotha decorations. Then, a deep vault, with a land-spring, irrepressible, heard trickling behind its masonry. Afterwards, as an Italian author, copied by an English gazetteer, writes, "descending again by a green and yellow-coloured jasper-lined staircase, at the bottom of the Panteone," there is an octagon, so many feet high and wide, with crucifixes, niches, and figures, sculptured by all manner of Italian artists, though not claimed as belonging to any especial type of modern, mediæval, or ancient art. The resolution of the young king, however, is rather an unsatisfactory one at the best. The Escorial is one enormous grave. It is a place of royal tombs, although, notwithstanding the terrible legends related concerning old kings and queens of Castile, the Pantheon, the Sacrista, the Cameria, the Palaces, and the many churches, are full of Christian history and inspirations, with the rich dark stalls of the chapels, the low and the high stall, the Titian cloisters, and the Corinthian illustration, wrought in several varieties of wood, of the victory of San Lepanto—with its overshading blues and yellows, colossal books, and Syriac emblems of silence. The Escorial is, to some extent, an *epitome mundi*, a history of the modern world, on a small scale, with all its chronicles of guilt and misery; but we have nothing to do with that—only, indeed, with the guide-maker's information—"Walk through the royal suite of rooms, which are not very royally furnished. First visit Don Carlos's with some pictures — a stray piece by Ribera—but a fly and a poodle are most pointed out. There is some good Madrid tapestry of hunting subjects; some china, some fine marqueterie panelling and steel hinges inlaid with gold." Amid all this wealth of art, we find the Escorial so singularly rich as to become a wonder that its treasures were never appreciated before. It was the Christian Alhambra.

COLOURED BUILDING MATERIALS.

MUCH as the subject of colour in building has been studied of late years, we fear that, in London at least, the attempt to impart colour to external architecture will be abortive. We have only to walk through Queen Victoria-street, Cheapside, or some of our recent thoroughfares, to become convinced of the non-success of the practice. Since the remains of Northern Italy, Genoa, and Venice have been made known to architects, all kinds of essays have been made in brick, tile, terra cotta, and so on, but the result in a few years is the same—the colours are sombred down to the dull monochrome of a smoke-laden atmosphere. Red brick and white stone—a combination that Mr. Street has adopted in the western front of his law offices, and in the very fresh and pleasing chimney shafts of that block—does very well for a few years at the most, but the colour soon becomes subdued, and the work assumes the same blackened hue which discolours and sombres down all our finest buildings. The horizontal bandwork of red brick and stone in the portion of the Law Courts above referred to already begins to lose something of its freshness, and in a few years the contrast between the materials will be lost. But red and white *per se* are not good colours to harmonise together. Red and black, red and orange or brown, red and grey, especially the greenish and bluish greys, are far better as a colour harmony; architects, however, have yet hardly become masters enough of chromatic harmony if we can judge by the exterior displays of colour in recent buildings. But of distasteful combinations the yellow stock and light red brick is the greatest, and we are sorry to find so many of our Board Schools have adopted the contrast. In London and smoky towns the red and yellow produce a dirty kind of orange that does not wear well, and as the Queen Anne admirers have gone in strongly for brickwork, we trust for the future a little more discretion in blending colours will be observed. What looks better than a dark red and grey brick, found so frequently in the structures of that period? yet it is strange to remark that the imitators of the style have not taken into account the pleasing and subdued tint of old brick buildings. Mr. Waterhouse, in his Prudential Offices in Holborn, lately illustrated by us, has artistically discarded a mixture of colour in the walls, which are entirely of a deep red, relieved by dark mortar joints. In this building the roof of a pleasing green slate has been made to contrast, and affords the proper complement to the red brick. In the Natural History Museum, by the same architect, the predominant colours of the terra cotta are the warm cream tint of the natural material, and a bluish grey in bands and voussoirs. The effect of the combination, as we have lately had occasion to remark, is all that can be desired. The polychromatists have obviously mistaken the scope of colour in architecture. They have insisted upon bright colours, while the monochromatists have been endeavouring to return to stone or brick. We refer to existing buildings of the first kind, to show that the use of bright-coloured materials has been a signal failure in London and most large towns, and the architects of the buildings themselves would be the first to acknowledge the fact. In this climate a variety of shades of brick or stone would be preferable. One of the most recent attempts to introduce coloured material is the employment of glazed coloured stoneware by Messrs. Doulton in their new buildings at Lambeth. The general effect of these buildings from the river—we are now speaking of colour only—is pleasing; the eye only discerns the subdued masses of material, but when we come within a short distance there is much that is crude and distasteful. We believe a more satisfactory result would have been achieved if the charming shades of grey, brown, and blue, which the material naturally assumes in the firing, had been employed. Some of the cornices, bands, diapers, window dressings, and the panelled window sills look out of place, and a strong conviction grows upon us that the stoneware decoration has been overdone, and forced into positions that would have been better occupied by brick. On the whole, however, we believe glazed stoneware may be employed largely as a decorative accessory to brick and stone buildings, although its successful adaptation has not yet been fully shown.

Of late we cannot have failed to notice a growing taste for stone. In the City, and the Poultry especially, several new buildings have been entirely faced with stone ashlar. Now here we have an opening for colour of a less decided but equally pleasing kind. When we consider the immense variety of building stones, it is surprising that a combination of them to produce variety of tint has not been attempted. We see here and there the Mansfield and other red sandstones introduced, but not in that general manner that suggests itself to us. The Devonshire marbles, or glass mosaic, offer themselves as easily procurable and cheap kinds of inlay in panels and friezes. Then we have plasters and stuccoes of different shades that might be pleasingly made to relieve large wall surfaces of white or red material. The greenish grey of Portland cement may be made to harmonise well with warm-coloured stuccoes or cements like Roman cement, and with the help of coloured sands still stronger contrasts might be made. In high roofs much more than is generally attempted can be accomplished in selecting a slate or a covering that makes a pleasing contrast with the walls, and slate or tiled roofs might often be much improved by introducing diapers, bands, and other ornamentation of a different colour or darker shade. We note the roofs to the New Law Offices, for instance. We have confined our remarks to exterior decoration; but, of course, the architect is master of the situation in the interior decoration; and here the Japanese artist, with his charming and refreshing blue porcelain and painted tiles, and his inlays of various materials, can teach much. We are quite sure that, if our external colouring is to become an aid to our architecture, we must employ local materials that harmonise, rather than those that produce discord—shades rather than colours—and, secondly, that bright colours, if introduced at all, should be confined to details.

A HYDRO-GEOLOGICAL SURVEY.*

WE have more than once urged the importance of hydro-geological surveys in these pages. In all future schemes of drainage and water supply, the assistance afforded by a knowledge of the position of the water-bearing strata, and the variations in the height of the water line, must be of considerable advantage. In a recent issue of the BUILDING NEWS, commenting on the proceedings at the last Congress at the Society of Arts upon the water supply of towns, we referred to a paper read by Mr. Joseph Lucas, F.G.S., upon the subject, in which that gentleman advocated the value of a survey of this kind in relation to the question of the water supply of the metropolis, and indicated some important facts bearing upon the water-shed basins of the metropolitan area. Mr. Lucas has just published two maps illustrating these views, showing the contour lines of the artesian system, and the chalk springs of the north-western and south-western districts of the metropolis. One of the sheets (numbered 2) before us, comprises Watford at the north-west corner, and Enfield on the north, embraces the northern half of the metropolis, and takes in an area of 216 square miles in the counties of Middlesex, Hertfordshire, and Essex, and the basins of the Colne, the Crane, the Brent, and the Lea. In this survey we have the areas of outcrop plainly shown by contour lines in red and yellow. The chalk water system is shown at the left hand top corner of the map, and includes Watford, the area being hatched a light blue, while dark blue lines indicate the minimum water contours.

* Hydro-Geological Survey. Sheets I. and II. London: Printed for the Survey by Edw. Stanford, Charing-cross.

The wells, dug and bored, are also shown by blue circles. The greater portion of the sheet, however, shows the artesian system. The impervious clays are coloured light black, the areas of overflow by light and dark red and yellow hatchings, indicating the chalk and sand springs. The artesian contours or planes of the chalk springs are defined by wide and narrow red lines, and the sand-spring contours by yellow lines; while the wells dug and bored, besides the obsolete wells and borings, and sand springs, are clearly indicated by red and yellow circles. In the metropolitan area the contour lines are laid down to represent the level of the water on Monday morning when most of the pumps in London have ceased working for 40 hours. The area included within this map is covered by the tertiary strata, except the north-west corner, which embraces the outcrop of chalk in the Colne Valley—from Watford to Radlett. Two water-bearing beds outcrop—namely, the chalk and the Bushey sand. The Thanet sand underlies a considerable portion of the area, and these two beds of sand overlap in one part. Mr. Lucas remarks, in explanation of this sheet, "the key to the sheet, as regards the original planes, is the artesian planes, augmented by the elevated area of influx in the isolated catchment basin of North and South Mimms, and another similar point in Ruislip parish, to both of which the artesian plane rises in the form of a dome, and the focus of the system at Ordnance Datum in Woolwich Reach." The metropolitan pumpings have considerably depressed the planes. Mr. Lucas observes: "The depression from this cause below the level of Ordnance Datum occupies an elongated area, whose major axis runs in a north-east and south-west direction for 18 miles, having for its foci Reid's and Meaux's breweries, and whose minor axis is about 8 miles across."

In Sheet 1 we have another similar area on the south side of the metropolis, including on the south Croydon, Sutton, Malden, Hersham, and Hounslow, and Ealing on the west. In the present sheet (second edition) a few yellow lines, denoting the sand springs in the south-eastern corner, have been added. These two sheets will be found of considerable value to sanitary authorities.

As Mr. Lucas observes, the qualitative stage of analysis must precede the quantitative. The positions of the underground water-shed ridges, and the basins they divide, belong to the first of these stages; in the second or quantitative stage, we have to discover the variation of the underground reservoirs due to the fluctuation of the rainfall absorbed. We take, in the language of the author, "a dimensional survey of an aqueous mass of irregular shape in the earth beneath our feet and in the hills around us, the wells being our telescopes." Of course, the mean quantity of rain absorbed establishes the mean water line, and it is necessary to observe the heights of the water line at irregular intervals over a sufficiently long period, and the mean rainfall during the same intervals, compared with the mean for the whole period, will explain the differences of the observations. Upon this system Mr. Lucas has assigned to each position of the water line in the chalk its appropriate quantitative value, which has been published in a paper on the chalk water system. The yield of an area, or the quantity of water that can be obtained with a given depression of water line, has also been shown by Mr. Lucas, whose observations have been conducted with much care and skill.

We take these mappings out of the subterranean reservoirs to be a step towards a correct and scientific knowledge of our water resources, and, if Government would undertake a complete survey of our water-shed areas upon a similar plan, we are sure much money would be saved that is now spent on fruitless schemes of water companies, while future works would be undertaken with a better prospect of success.

The scale of the maps before us is 6in. to 4 miles. One of the most useful features in them is the demarcation of the areas of overflow which are shown by the lighter tints; and if these only had been recorded the maps would have possessed much value to all sanitary authorities and hydraulicians. But the information they offer of the areas of the water basins, and their use in the economical distribution of water, is of even greater consequence.

ROYAL ARCHÆOLOGICAL INSTITUTE.

VISIT TO NORTHAMPTON.

[FROM OUR OWN REPORTER.]

THE annual meeting of the Royal Archæological Institute of Great Britain and Ireland is being held in the county town of Northampton, the head-quarters being at the new Guildhall, erected 14 years since from Mr. E. W. Godwin's designs, and illustrated by us at the time. In this town is an excellent permanent museum, rich in Roman urns and pottery, found at Northampton, Castor, Daventry, Towcester, and other parts of the county, earthen vessels, and armour of the middle ages, ancient shoes and other specimens of local manufactures, portraits, &c. In this room was also arranged a temporary exhibition, lent by patrons and members of the Institute—these including a very fine series of water-colour sketches of churches, castles, and monastic buildings in the country, numbering over 120, about 70 of these being the work of the late Rev. Mr. Petit, and the others by Mr. E. F. Law, of Northampton. Amongst other exhibits were a large collection of prehistoric flint and bone implements, from the eastern counties, lent by Mr. Sharp; and Roman and Saxon remains lately found at Duston; bronze fibulæ and buckles, lately found at Irchester Camp, and shown by Rev. R. S. Baker; a walrus tusk, beautifully carved as a drinking-horn, said to be of the eleventh century; limoge enamel plaque and crozier, a staff with open beaten silver head, used by Lord Compton as constable of the Tower, temp. Charles II., all lent by the Marquis of Northampton; a Holbein portrait of Catherine Parr, and contemporary portraits of Lord and Lady Shrewsbury, all painted on wood panels, and lent by Mr. Booth, of Kettering; tesseræ from the Temple of Diana, gilt on face, and other fragments of mosaic from Greece and Rome, Roman statuettes, an early watch, mediæval keys and buckles, and carved pearl shells, shown by Mr. H. Mullinger, of Northampton; early manuscripts and printed books, casts from mediæval seals relating to the county, exhibited by Mr. R. Ready. The loan collection was not so large as on many previous occasions, but the exhibits were of an interesting character.

TUESDAY.

THE PUBLIC RECEPTION

of the Institute by the Mayor and Corporation of Northampton took place in the Council Chamber on Tuesday morning. The President (Lord Talbot de Malahide) having taken the chair, the Town Clerk read an address of welcome, in which it was remarked that "our town and neighbourhood exhibit many interesting architectural remains, churches, chapels, mansions, and memorials of the past which will well repay the investigations of the historian and the antiquarian." The Mayor (Mr. Thomas Tebbutt) added a few words of welcome, and the President replied, alluding to the many associations, historical and constitutional, connected with the county and its capital, and to the recent loss sustained by the Institute by the death of the Rev. A. Hartshorne. Other addresses were presented from the archdeacon and clergy, and from the Northamptonshire and Rutland Architectural Society, reference being made in the latter to the restorations carried out in many of the churches, and inviting suggestions as to the treatment of those yet unrestored.

Lord Alwyne Compton then took the chair and delivered an address in which he dealt with

THE RESTORATION QUESTION.

Through the length and breadth of the country the ancient buildings had been restored at a cost of many thousands of pounds. This work was now called little else than destruction by the Society for the Protection of Ancient Buildings. No doubt there was some truth in the assertion. Workmen liked a good job, with finished and complete work. They prefer spick-and-span novelties to crumbling stones. Thus rich mouldings are sometimes simplified by being cut down, and even where the old work is copied much of the beauty is gone and its spirit missing. While to the archæologist an unrestored church is a special delight, yet when it was contended that no improvement must be attempted, and nothing added, this is felt surely to be a mistake. The suggestion that if a church is too small or is inconvenient that—instead of adapting, it should be banded and tied together and abandoned, and a fresh one built by the side, is too preposterous to be argued. The difficulties that had arisen in the face of legislation to provide for the simple loss from cultivation of the few acres of ground covered by ancient monuments was sufficient to show its impracticability, and that no response would come to the appeal to build the suggested new churches except from the small band of members of this society, and the buildings so preserved would soon fall into hopeless decay. They had for study during these meetings two examples of restoration which he thought went far to vindicate restoration when duly carried out, from the attacks made upon it. St. Sepulchre's was one of the few circular English churches. It had been restored by the late Sir Gilbert, then Mr. Scott, working with some of the members of the County Architectural Society, and the local authorities, and the antiquary would find the building more worthy attention than before. No attempt was made to replace the exact circular church of Simon de St. Liz, but many features previously concealed were now exhibited. The other example was in some respects more remarkable—that of the Queen's Cross. Many of these proofs of Edward I.'s conjugal affection had perished from decay. This at Northampton remained in consequence of three successful restorations. In 1713 it was restored by the county magistrates, and again it was repaired in 1762, and lastly at a comparatively recent period by Blore, the architect. A more crucial example of the good or evil of restoration could hardly be imagined than this cross. The dates of the threefold restorations were enough to frighten an antiquary. Queen Anne's time, whatever it may have been in respect to furniture, was not a Gothic era—1762 was a period of taste not yet mastered, and Blore's work did not always commend itself to the judgment. Yet when Mr. Law, stirred up by the bitter words of a paper read at the Archæological Association 16 years ago, examined minutely and carefully the cross, he found the restorations had been so carefully done that but for the difference in the stones it was not easy to distinguish the new work from the old, and all the most singular features in the design, which had been attributed to Blore, existed in the original work. Thanks, therefore, to several generations of restorations, Queen's Cross remains as it was when first erected, nothing being wanted except the termination, which, in a true spirit of conservative restoration, was left imperfect by Blore. These instances, and there were in the county many other restorations carried out with equal care, he thought a fair answer to the attacks on restorers generally. The protection against mistakes in restoration could be afforded in a twofold way—first in the more accurate taste and the greater esteem for old work diffused by this and kindred societies, and secondly by the preservation of records of what existed prior to restoration being undertaken. Both these purposes would, he thought, be furthered if all archæologists and architects would work together. To this end he suggested the amalgamation of the Archæological Institute and Association, the affiliation to the one great body

of all county associations formed for a like purpose, and the taking of united action with the Society of Antiquaries, the Royal Institute of British Architects, and other societies.

Lord Talbot de Malahide proposed a vote of thanks to Lord Alwyne Compton for his address, which was full of suggestions. Although he was a member of the Society for the Protection of Ancient Buildings, he would admit that restoration was necessary in many cases, but the extent to which the process had been carried on was so outrageous in many cases as to threaten the destruction of many old monuments.

Mr. J. H. Parker, C.B., thought none of those who objected to restoration would like to retain in our churches the donkey boxes and boarded-up windows of the last century. He wished the society referred to would carry on its duties with more discretion. He had recently received a letter from the secretary, asking if he would complain of the work that had been carried out by the Rev. Mr. Jones at Bradford-on-Avon. Now Mr. Jones had found the ancient church at Bradford 30 or 40 years ago divided into three or four cottages; he bought these up, and bit by bit cleansed and restored it, under the supervision of a strong committee, and with an able clerk of works.

The members were then invited by the Mayor to luncheon in the lecture-hall, Gold-street, and subsequently visited

ST. PETER'S CHURCH.

Mr. J. H. Parker, C.B., delivered a lecturette in the church, describing the edifice as of the finest and latest period of Norman, principally erected about 1160, just prior to the change in style. The narrow north and south arches, covered with banded mouldings, were very characteristic of the date he assigned. Although at first sight easily understood, further inquiry showed several points of difficulty. The chief of these was, that neither the east nor west end existed as originally designed. The east end was destroyed long since, probably in the reign of Henry VIII., and the last two bays were the work of the late Sir Gilbert Scott—very good and quiet work of its kind, but not a reproduction, for the old church, he thought, ended in an apse. The windows in the side walls were of Henry VIII.'s time, inserted into the thick Norman walls, and the clerestory was original; the exterior of the church was very peculiar. Trees existed where a wooden screen had divided the church into nave and chancel, just where the present pulpit stood, and it seemed that a commencement was made in Norman times of vaulting the side aisles—a work never completed; the nave had then a flat roof, and not the present barrel vault. As to the west end of the church, beautiful as it was, it was a rebuilding, executed, probably, in the reign of Henry VIII., the materials being taken from the apse, or more likely, as the work appeared to be of still later Norman character than the main building of an old chantry destroyed at the Reformation. Mr. Parker pointed to the windows of the south aisle wall, cut through by the tower in support, and said the deep three-membered tower arch, rich and beautiful as it was, had been evidently rebuilt, and that not quite perfectly.

Considerable discussion followed, Mr. Fairless Barber suggesting that the base of tower is original, and that it forms a central point in the church as was usual in Norman buildings; in support of this conjecture, he pointed out that there was no distinct breadth between nave and chancel. Several members said the west face of the tower had never been built in. Mr. Sharp thought the tower-arch was diagonally that at the entrance to apsidal chancel. Mr. Micklethwaite contended that the aisles had never been vaulted, for there was no room. Mr. Parker added that the capitals of the arcades, adorned with interlaced carving, were formerly covered with whitewash, but were cleansed by Miss Baker, sister of the county historian, who most carefully scraped the work with a bone paper-knife; this labour of love occupied the leisure of several years, and set an example to ladies which might be followed with advantage. The members then viewed the extension of the church, further discussion taking place as to the west tower. It was generally conceded that the lower part was a re-building (all agreed that the upper stage, which is of a different and more ruddy stone, was comparatively modern), but the date at which this was executed was not agreed upon. The circular buttresses at the angles which are tied across the face of the tower by string courses of mortar mouldings, were considered by Mr. Parker and others to be as late as Henry VIII.'s time; Messrs. Lane, Fairless Barber, and others said there were no authenticated examples of such a treatment so recent. The richly-ornamented head * over west doorway is later than that of the tower-arch; the members of the former may originally, it was suggested, have been recessed as the other is, but are now on the same plane, and flush with wall surface. The carving of the voussoirs and caps throughout the church is one of the most elaborate examples of Norman work remaining.

THE CASTLE

was next visited. It occupies a quadrangular raised site, overlooking a branch of the river Nene. The remains are very scanty, and are confined to a low line of rough masonry inclosing the inner valley, and on the side next the stream a postern gate, with acutely pointed archway of three well-recessed members, and curtain on inner side. Mr. E. F. Law exhibited photographs of the bastion, and large columns uncovered and destroyed for the use of the materials in building a few years since. All the remains appear to date from the early years of the 14th century. Regret was expressed at the statement that the site has been sold to the London and North-Western Railway Company, who propose to level it and the adjacent ground, and to erect thereon a large goods station.

QUEEN ELEANOR'S CROSS.†

Mr. E. F. Law minutely described the memorial, and pointed out the traces of the three restorations, arguing that no material damage had been caused by these. The oval enclosure on Huntsbury or Hunsborough Hill, known as Danes' Camp, was also inspected, and the valla and ditch were traced. St. John's Hospital was visited on the return journey. The building is a plain stone structure of the Decorated period, and consists of the common hall and dormitories above it. The chapel is of the latest period of Decorated Gothic, and there are several fragments of stained glass of the 15th century. It was stated that it was probable this, like the castle ruins, is likely to be removed, to make room for an extension of the Midland Railway.

SECTIONAL MEETINGS.

In the evening a meeting of sections was held at the Town Hall. Mr. John Evans delivered the opening address of the section of antiquities, of which he is president. In this he sketched the history and growth of Northampton, and passing on to consider the antiquities of the county, suggested that palæolithic remains would probably reward the research into the gravel distributed on the borders of the Nene. The Roman occupation of the district was referred to, especially with reference to the local mintings of coins during that period, and some fine pieces of money of late Roman date were exhibited.

The Rev. R. S. Baker read a paper in the historical section on "The Nene Valley as a Roman Frontier." He traced the lines of camps from Irchester northwards, at which Roman coins or other relics have been found on the high grounds along the line of the river Nene, and showed that these occur at intervals of about seven miles apart, and urged that the Nene was the "Antona" of Tacitus, which Tacitus speaks of as one of the lines of defence of Osterius from the unsubdued natives on the west. The etymology of Northants, the North Antone Scire of Domesday, was minutely investigated. A discussion followed, in which Messrs. M. H. Bloxam and J. T. Burgess controverted Mr. Baker's theory as to the lines protected by the Nene Valley camps, and stated that they formed part of a much larger scheme of defence running throughout the midlands of England.

* Illustrated a few years since in the "Building News Sketch-book" series.

† Illustrated in the Building News in January last, p. 54, Vol. XXXIV.

WEDNESDAY.

The earlier part of the day was devoted to a circuit of about a score miles by carriage, through an upland district on the north-west and north of head-quarters.

HARLESTONE CHURCH,

Where the first halt was made, has considerable interest, as the dates of the erection of nave and chancel are known. The tower is square and Early English, and was raised prior to 1294. The chancel was re-built, we learn from an MS. in the Lansdowne Collection, British Museum, by Richard de Hette, then the rector, in 1320, who also re-erected the nave in 1325—statements confirmed by the inscription on De Hette's tomb in the south aisle. The edifice is large, and executed in the local red oolite. It is a good type of a Decorated church, with north and south aisles, vigorous mouldings, and reticulated tracery in, and hood mouldings to, the windows. The octagonal columns of the south aisle are slightly fluted—a peculiarity also noticeable at Brington Church, the one next visited. Among the 15th century insertions are some of the south aisle windows and a clerestory on either side, and the rich sedilia and piscina. The church was restored by the late Sir Gilbert Scott, who replaced the cuspings to windows from portions built up in the walls. Some discussion took place with reference to two low windows or "hagioscopes" at the angles of chancel and nave, which Mr. J. H. Parker regarded as lepers' windows, whereas Mr. Bloxam and others considered they were simply used for the purpose of giving "utter communion." It was elicited that these were blocked up (probably since the Reformation) till opened out during the recent restoration. The Rev. Prebendary Venables, of Lincoln, raised a protest against the removal from the wall of a memorial tablet to an incumbent who died so recently as 1808, to the small crypt beneath chancel, and maintained that, however incongruous in style, it should not have been hidden from sight.

ALTHORPE HOUSE,

The seat of the Spencer family, was next seen It is an unpretending fabric, ⊔-shaped, and cased with white brick, with Classic pilasters, at the beginning of the present century. It is now closed, and in the hands of the builders for alterations, and only one gallery could be entered. In this long room were arranged a series of portraits and a selection of books from Earl Spencer's library of 33,000 volumes—probably the finest private collection in existence. The books exhibited to the members are of the earliest period of printed works, including several works by Caxton and Wynkyn de Worde, a Biblia Paupera, with some of the block pictures of which it is composed coloured, and the famous block book, "St. Christopher," in which the imprinted date MCCCCXXIII., has been supposed to be an error, as it is much anterior to any other. Most of the works shown are beautifully bound, some in velvet and gold, and several contain well-painted illuminations. Just outside the park is

GREAT BRINGTON CHURCH.

It has a large double-aisled nave and west tower, both of the latest type of Early English, with some windows and clerestory inserted by the first Sir John Spencer, who died 1522, by whom the chancel was also rebuilt. It is believed that the sixteenth-century works (which are extremely good for so late a period) were designed by Thomas Heritage, presented to the living in 1613; he was also chaplain to Henry VIII., and surveyor of that King's work at Westminster. Henry VII.'s chapel at Westminster Abber is attributed to Heritage. In the chancel are a series of monuments of the Spencers, chiefly of the Late Tudor, Elizabethan, and Early Renaissance character, and much resembling, in their canopies, supported on columns, four-post beds, the odd resemblance being heightened by the effigies on the tomb slabs. The treatment of these monuments, and the costumes of the recumbent figures, afford an instructive series of dated examples of the transition of architectural fashion from Gothic to Free Classic. The earlier monuments are of marble, decorated in colour, and embellished with heavy pendants, pyramids, globes, obelisks, and like features, Classic allusions being introduced to the later

ones. One of the most interesting examples is that of the third Sir John Spencer (obit 1599); it was designed by John Thorpe, and has a lofty canopy, with under surface broken into embossed compartments, and supported upon square alabaster piers, and blue marble columns, the former covered with incised ornament. Although over-elaborated, the work exhibits much of the characteristic fancy of Thorpe's work, and has some traces of Italian feeling, interesting in connection with the tradition of its identity with John of Padua. The most recent memorials of the Spencers include figures executed by Flaxman and Nollekens, and a bust by Chantry, and on north side of chancel a five-sided chapel of Tudor type was thrown out by the last earl in 1846. In the chancel is a slab to the memory of Lawrence Washington, died 1616, said to be the last English ancestor of George Washington; it shows the family arms as three mallets and two bars in chief, impaling a chevron between three covered cups. In the nave is a brass to Robert, father of the above Lawrence Washington, showing the same bearings in chief, and it was stated that they appeared on George Washington's seal, and so suggested the "Stars and Stripes" of the United States: if this is not the case, it is certainly a remarkable coincidence. The church has other features of interest, notably the many fragments of 15th and 16th century stained glass, the well-carved oak bench heads and ends, some of them like altar rails, decorated with stencilling, while outside is a 14th century canopied recess, containing a priest's effigy. Just outside the churchyard is a shaft of 14th century cross, 12ft. in height, and elevated on lofty pedestal and three steps; the termination is modern.

Passing East Haddon Church, a 14th century building recently restored by Mr. Law, of Northampton, the site of

HOLDENBY HOUSE

was the next halting-place. The house was rebuilt for Chancellor Sir Christopher Hatton, from the designs of John Thorpe (see articles and illustration in our last vol.), and afterwards became a royal palace. In it Charles I. became virtually a prisoner for five months in 1646-7, and from thence he was removed by Cornet Joyce to Hinchinbrook, and deprived of the last sembiance of personal liberty. Holdenby was sold in 1650 to one Baynes, M.P. for Leeds, who, anticipating the Restoration, prudently demolished the palace for the sake of the materials, with the exception of two large gateways at the sides of the green court and a sunk portion of the offices at the back of the second quadrangle, in which he lived. These were re-assumed by the Crown ten years later, and now belong to the Clifden family. The farmhouse was restored two years since by the late Mr. Slater, and now forms the residence of the Viscountess Clifden. The spacious gateways, now quite isolated from other masonry, are of red and grey stone from Harlestone and Walford, and each has on them the date 1683 carved in relief in twisted scrollwork. Little remains of Thorpe's work in the house, except some rough external masonry and a chimney-place. The chimneys are arranged in pairs, coupled at the top, and are very good examples. Mr. Albert Hartshorne has ascertained by measurement that the same templates were used for the mouldings of chimneys and windows at both Holdenby and Kirby. The house is again filled with paintings, tapestry, and china, but these treasures have little connection with the history of the older building. In the garden is the top of one of "the very high pyramids of stone," formerly accounted the wonders of Holdenby; these were painted with the arms of all the gentry of the county, and on this apex can be deciphered those of the the Fitzwalters and Bouchers.

HOLDENBY CHURCH,

Which closely adjoins the house, is chiefly of the Late Decorated period, and was restored by Sir Gilbert Scott ten years since. The chancel was rebuilt upon Sir Henry Dryden's designs in 1848, and coloured by Mr. Sutton. The most interesting feature is the Renaissance screen now dividing chancel from nave, which was brought from the chapel of Holdenby House. It is carved in oak, and is heavy in composition, with a superposed arch above the principal one, and adorned with a Medusa's head, couchant lions, half-clad Roman warriors, and other incongruous subjects. The south aisle is very wide, but the whole church suffers from want of light.

SPRATTON CHURCH.

In this building, also restored by Sir G. Scott, there is much Transitional Norman work in the doorways and arcaded work on the lower stages of tower. Above this arcading, which is of the time of Henry II., another stage and a fine broach spire, with open lights, were added in the 14th century. The north arcade is of the same date as the tower; that on the south side is Decorated. Near a north chantry is an altar tomb bearing the effigy of St. John Swinford, died 1371, executed in Chellaston alabaster, and wearing a bassinet chain armour, and the SS. collar—the latter said by Mr. A. Hartshorne to be the earliest sculptured example in England. In the churchyard is the octagonal shaft of a cross 10ft. in height and 38in. in girth at base.

BRIXWORTH CHURCH.

This well-known and oft-illustrated edifice was the last one visited. It is chiefly remarkable for the great number of thin bricks used in its construction, partly as voussoirs to circular arches, over nave windows, and over doorways, now walled up, and partly as window coursing with rubble, and in herring-boning. Mr. A. Hartshorne has remarked that there is no trace of "long and short work," as in most of the reputedly Saxon churches. During the restorations effected by the late vicar, the Rev. C. F. Watkins, assisted by Mr. Slater, this use of thin bricks was further revealed; the square chancel of Henry VI.'s time, figured in Britton's and Rickman's views, was removed, and a polygonal apse substituted on the old foundations; several of the western bays on the south side and one bay on the north were rebuilt, and the lancet or square-headed windows replaced by others of circular form. On the west face of the tower is a projecting turret, circular in form, containing the belfry stairs; above this tower, which is Late Norman in character, has been added a Decorated stage and broach spire. A few feet beyond the modern apse is a well-like round inclosure of masonry forming an ambulatory. Mr. Parker expressed the opinion that the bricks in the arches were of Roman origin, and of the third century, as within the mortar six of them go to the foot. He thought that the structure might have been built by the Romans, and not as had often been stated, by the Saxons, even to the clerestory, although the latter was set back nearly a foot to allow of the abutment of aisles. He directed notice to the extreme thickness of the walls, and to the basilican plan, and suggested that the tower was added in the 11th century, and was built upon a porch with four archways, as at Monkwearmouth and Holy Trinity, Colchester; the west turret was slightly later. The apse was undoubtedly Christian, and not Roman. The vicar (the Rev. Mr. Gedge) exhibited a plan of the building and of the foundations; these indicate a nave of four bays, 60ft. × 30ft., with traces of north and south aisles, 8ft. 6in. in clear, parallel throughout with this and the chancel, 30ft. × 30ft., and at the east end a polygonal apse, with circular enclosure beyond. He asked whether this might not have been a fourth-century Roman basilica, and called attention to an eagle sculptured in stone found in the walls, and to the Roman bronze swords and coins turned up in the immediate vicinity and the entrenchments near by. It was singular that they were now in a building of the exact proportions and size of Solomon's Temple, taking the cubit as 18in. Mr. Bloxam attributed the building to the eighth century, when there was evidence to prove it existed as a cell to Redehampstead (Peterborough) monastery. Messrs. Evans and Micklethwaite asked where such a population as could need a Roman hall of justice of those dimensions could have resided, whereas as a monastic chapel its erection was easy to understand. Mr. Sharp said both the swords and the pottery were British, not Roman. Mr. G. T. Clark, of Dowlais, said there was no doubt as to the Roman remains; they had them before their eyes in the bricks, and these must have been found close by from the quantity of the material used. The proportions were not those of any basilica—the building was too long and too deep, and the narrow apsidal arch would prevent the judge from seeing or hearing. The workmanship was also too rough, and the arches did not radiate properly. Undoubtedly the building was erected for Christian worship from Roman materials found near by. This appeared to be the generally accepted opinion, and the members then examined a small reliquary of stone, of Early English period, and the sculptured eagle. The several alterations could, Mr. Bloxam said, be easily detected by the different classes of stone employed, as well as by the minor differences in the work. Chief stress was laid on the most recent reparation—that effected by Mr. Blore, in conjunction with Mr. George Baker, the county historian, and Miss Baker—and it was sought to be demonstrated by reference to the drawings, that for the tracery in the tympanum of the lowest story, and especially for the debased ogee member, which had been denounced as innovations, there was not only authority in other stones built into the cross, but also in the south side of the chancel of Northfleet church, the east window of Stratford St. Mary, Suffolk, the Chapter House, Wells Cathedral, and other buildings of a contemporary date, now set into the wall by the beautiful Norman south door; this figure, which measures 18in. by 12in., and represents a bird with four expanded wings, was pronounced by Mr. Bloxam to be Anglo-Saxon, and not Roman.

In the evening a conversazione was held at the Town Hall, when Mr. E. F. Law read a paper on

NORTHAMPTON QUEEN'S CROSS.

The lecture was illustrated by a series of ancient engravings of the memorial, and by measured drawings of it, made by Mr. Law and his sons, in conjunction with Mr. Irvine, formerly one of Sir Gilbert Scott's clerks of works. In his paper Mr. Law defended the restorations of 1713, 1762, and 1836, as in the main faithful and true. As to the probable termination of the cross, Mr. Law said the broken shaft now forming the top was added by Mr. Blore, in place of a Maltese cross placed there in the last century, for which no authority could be shown. The building accounts showed that the cross was built from the design by one John de Bello, and that William de Ireland, "inaugurator," was paid £6 3s. 4d. for "five images:" four yet remained in the niches surrounding the cross, and there was no other place for the fifth than the summit. Glowing reference was made to the serenity and purity of these conventional representations of Queen Eleanor, and Mr. Law expressed his satisfaction that no attempt had been made to reproduce the crowning figure.

THURSDAY.

The annual meeting of the institute was held in the morning.

An excursion by rail was subsequently made to Wellingborough, and from thence by road to Irchester camp and church, to Rushden church, and to Higham Ferrars, where the party divided—one section visiting the fine churches of Raunds, Stanwick, Irthlingborough, and Finedon, and returning to Wellingborough; the other making Thrapston a fresh centre for the afternoon, and proceeding thence to Islip and Lowick churches, and to Drayton House.

To-day (Friday) sectional meetings are to be held in the morning, afterwards the Round Church of St. Sepulchre and St. Giles's Church will be visited in the course of a general perambulation of the town; and in the afternoon the members will proceed by road to Earl's Barton church, Castle Ashby, Whiston and Cogenhoe churches, returning by rail from Rockingham station. The programme for Saturday includes an excursion by rail to Kettering, and from thence by road to Rothwell, Rushton Hall triangular lodge and church, Geddington Cross, Kirby and Rockingham castle and church—sectional meetings being held in the evening. On Monday visits will be made to Oundle, Cotterstock, and Fotheringhay, where the party will divide—Barnack church and Burghley House being visited by one section, and Peterborough by the other. The proceedings of the Northamp-

ton meeting will be brought to a close on Tuesday next, when, after the sectional meetings, it is proposed, if the railway be open, to visit Canons Ashby. We shall continue our report next week.

HYDROSTHETICS OF THE CISTERN, DRAIN, AND SEWER.*

THIS is the euphonious title of a little brochure treating of the sanitary contrivances of a house. The author, Mr. Thomas Morris, architect, of Regent-street, has written and published many books more or less directly bearing upon architecture, and the present work will be read with interest by many of those who are seeking to lift the hydraulics of the modern dwelling-house out of the domain of empiricism and plumbers' tinkering. Mr. Morris begins by referring to the cistern, and gives a graphic account of the history of that early contrivance. We read that, in "the year 1237, Gilbert Sanford, at the request of Henry the Third, gave permission for the conveyance of water from the town of Tyburn by pipes of lead into the city. The pipes were 6in. in diameter, and terminated at a point near Bow Church, Cheapside, where a suitable erection of stone, the first of the London conduits, was raised." This conduit was made for "the profit of the city and good of the whole realm thither repairing—to wit, for the poor to drink and the rich to dress their meat." Stow describes a cistern of lead, "castellated with stone," as the first great conduit in West Cheap, begun in 1285, fed probably by an extension of Sanford's pipes. We read also of the "tonne" at Cornhill, conduits in Cheapside, Fleet-street, Leadenhall, &c., and in connection with them we find the pump a remarkable feature of old London, giving the names to localities as Pump-court. The primitive conduit and pump at last became inadequate, and Peter Morris invented or introduced the water-mill at London Bridge in 1582, the motive power being the tide. Late in the sixteenth century the plan of cistern pressure appears to have been introduced. The author traces the establishment of the water companies—the first being the New River Company, associated with the name of Sir Hugh Myddelton, in 1619, followed by the Chelsea, the East London Works, the Grand Junction, and other companies, these being stimulated no doubt, as Mr. Morris intimates, by the use of steam power for pumping. So great a change has taken place that, as Mr. Morris reminds us, chemical softening is now added to mechanical refinement, and the daily quantity required for the metropolis approaches 120,000,000 gallons. Indeed, had such a service as we have now existed earlier there might not have been a great plague nor a great fire.

But let us briefly describe Mr. Morris's suggestions, having a constant supply in view. The author shows that if district and street pipes were always at work they might be much reduced, and that a ¾in. rising main would suffice to supply a house, rendering the consumer independent of the company, while the latter could choose its own rate of delivery. As six gallons to the cubic foot is the approximate capacity for cisterns, a 4ft. × 3ft. × 2ft. 6in. cistern would be sufficient. In Mr. Morris's improved form the lid is made dust-proof, with a small trap in the centre for cleaning purposes. At one end, near the tap, is fixed a small box or cistern, in which the rising main terminates, with a regulating valve, which regulator shuts off the supply as soon as the large cistern is full. From the small box projects an overflow pipe to carry off any waste to a visible outlet. The rising main also serves the purpose of a down pipe for drawing water by means of a valve in the connecting pipe. "Companies," says the author, "have objected to taps on rising mains, but a one-way valve and stop-cock at the foot of the pipe would prevent the possible return of impure or any water to the street pipes." By a simple cylinder of porous material fitted into a metal case, and forming part of the rising main, the water may be filtered before it reaches any story of a house, and may be drawn off from the outer case by a tap. The author referring to lead, observes of it that lead has been found free from all deleterious effects upon pure soft water, and is best adapted for substantial construction. To prevent the passage of foul air from the drain into the cistern, a small watertight box is fitted at the bottom of the other end of the cistern, fed by a bent pipe or siphon, that forms an effectual trap; a "waste preventer" may be inclosed in this box, and an air pipe must be fixed from its top. From the lower side of the box descends the latrine pipe for flushing, which should be 1½in. bore, and other necessary branch pipes. Mr. Morris proceeds to treat of the different sorts of valve and pan closets, but says little that is new respecting the connection of the house drains with the sewer. Regarding ventilation of the soil-pipe, we find that the ordinary plan of allowing it to run up and terminate with an open outlet is recommended, besides a trap at every inlet. Our author does not say much about the more effectaal plan of disconnection we have so often advocated here, though good advice is given in the advocacy of outside soil-pipes. Mr. Morris alludes to the Alnwick drainage as a model, where the earthenware sewers increase from 6in. to 18in. bore, and have a fall of 1-400th of their length, and where the house drains are 4in. pipes, though 6in. is recommended. We note that an inch in 20ft. is suggested for the house drain, and that a small cesspool with a "dip" is recommended in the area to check the passage of sewer gas into the house (presuming the drain traverses the basement), and to admit a current of air through the house drains. Apropos of cowls, the author observes that the result of experiments on them conducted at the Kew Observatory, prove that "*cæteris paribus*, none of them cause a velocity of current exceeding that in an open pipe." A chapter on the "sewer" closes the book. After sketching the history and system of the metropolitan drainage, of which the author approvingly speaks, and drawing a comparison between Sir Christopher Wren and Sir Joseph Bazalgette—the first as the projector, and the latter as the engineer, of the sewers and Thames Embankment—the author takes the view we have before adopted, that if all the houses of a town were provided with open soil-pipes, the sewer gases might be carried away harmlessly. By those interested in sanitary questions Mr. Morris's little treatise will be read with profit.

* Hydrosthetics of the Cistern, Drain, and Sewer. By Thomas Morris, Architect. London: Simpkin, Marshall, and Co.

THE MUNICIPAL AND SANITARY ENGINEERS AND SURVEYORS.

ON Thursday week the fifth annual meeting of the Association of Municipal and Sanitary Engineers and Surveyors was held in the Council Chambers of the Town Hall, Liverpool. Mr. Deacon, the Liverpool borough engineer, presided, and devoted an able opening address to proving, by elaborate calculations as to the mortality of Liverpool, that the existing state of sanitary engineering in the town was satisfactory. The president showed that, notwithstanding extraordinary disadvantages—such as the unfavourable character of the soil upon which the town was built; its enormous migratory populations, which left, in passing through it, a large residuum of disease and death; and its abnormal density of population per acre—the total death-rate of Liverpool from all causes was not exceptional. Moreover, the mean death-rate during the last two or three years, as compared with that of the previous five years, showed a diminution of 46 per cent., while in the corresponding periods the mean decrease in the 17 towns with which Liverpool is classed in the Registrar-General's returns, was only 23 per cent. Mr. Deacon considered that the important sanitary works of the last few years were to be credited with this result.

A vote of thanks to the president having been passed, a paper was read by Mr. Charles Jones, embracing some notes on certain municipal works executed in Liverpool, and in the evening the members dined together.

On Friday the medical officer of the borough read a paper on the cellar dwellings of the town. Mr. T. Mellard Reade read a paper on the "Geology of Liverpool in Relation to Engineering Work," which was followed by some discussion, and in the afternoon a visit was paid to the Bootle pumping station.

On Saturday Mr. Thomas Hewson read a paper on the present system of dealing with the Rochdale excreta, which was followed by the usual combat between the advocates of the wet and dry sewage systems. A carefully compiled paper on the "Ventilation of Sewers," by Mr. Ellice-Clark, was also read, but the views of the author scarcely seemed to find much favour with the rest of the members. We give an abstract of the paper, as it deals with a subject of interest to many readers, and towards the elucidation of which any well-considered effort is welcome.

Mr. Ellice-Clark said one of the chief objects of the municipal engineer was to construct conduits for the conveyance of refuse from dwellings in such a manner as to increase the chances of the healthy occupation of cities. It was now an almost universally admitted sanitary canon with those who had dismissed prejudice from their minds, that water was the agent which best removed filth from their dwellings; though there were still those who, from want of education, prejudice, or some other cause, would not admit this, and continued to exercise their influence over municipal authorities in a contrary direction. The time, however, was approaching when this law would not only be admitted, but universally acted on. Too frequently sewers constructed for hygienic purposes had been so ill-designed and constructed that disease, instead of being stayed by their agency, had become epidemic. And however careful the engineer had been to see his work properly executed, it had been found a difficulty of no small magnitude to render the carriers of filth innoxious. Some might say the difficulty never had been overcome. How sewers had been the means of spreading disease they were too painfully aware, and the contamination of air and water by modern systems had gone a great way to foster that opposition to water carriage which was so apparent in the sanitary authorities in the northern counties. The object of the paper was to show how the air was contaminated by sewer gas, what was the nature of the change taking place in the sewers, and in what direction search should be made for a means of preventing air-pollution so as to be dangerous. Not many weeks ago a paper was read before one of the engineering societies of London, where the diffusion of sewer air into the exterior atmosphere was characterised as absurd, the author of the paper declaring his belief that air should be imprisoned in the sewers by so-called traps. Here was such a lamentable want of knowledge as to be barely credible. To prevent heated air of a light specific gravity ascending through a heavier atmosphere was as much opposed to the laws of nature as to prevent heavy bodies falling through space by gravity. Again, their late president informed them that the sewers of Bristol were not ventilated; and, furthermore, that, having designed the system for that great city, had he to begin his work *de novo* means of ventilation would not be provided. This most remarkable conclusion showed that engineers were by no means unanimous, not only on the means to be adopted by which to accomplish ventilation, but as to whether they should or should not be ventilated at all. Engineers and sanitary authorities were apt to form opinions on this subject from approximate and misleading data—the one standard with them being the death rate, which had been arbitrarily fixed at something like 17 in 1,000. It would be a bold statement, but very close to the facts, to say that the death rate of any given town formed but a very rough index to the health of the inhabitants; therefore, because the death rate of Bristol was comparatively low as compared with other cities, and the sewers were unventilated, it was not a *sequitur* that sewers did not require ventilation. Sewers must be ventilated. Scientific medical men, who had devoted years of labour to the question called on the engineer to accomplish the work. The methods that had been proposed to effect the ventilation of sewers had ranged from having cast-iron cylinders over the sewers with furnaces therein, feeding exclusively on the gases, the flames from which were to act for street illumination in lieu of gas, to the manufacture of oxygen within the sewers themselves, many of them highly ingenious, but showing an entire absence of chemical knowledge. None of them

had held ground after the experimental stage, except the attempts to neutralise the air by placing charcoal between the sewer and the point of exit at the ventilator. But this so-called system of ventilation had been almost entirely abandoned. Charcoal, by impeding the entrance of atmospheric air into the sewers, practically sealed them, and brought about all the conditions found in sewers entirely without ventilation. So that after nearly 40 years' discussion they came back to open ventilation as the best-known practicable means of rendering sewer air innoxious, or of assimilating it to the air of the surrounding atmosphere. The disposal of sewer air by carrying pipes up the sides of houses was a mistake, as it impeded the free action of the currents, unless they were of such large diameters as practically could not be obtained. Sewer ventilation by rain-water or other pipes of small diameter could not be accomplished. To pass sewer air up such columns there must be either pressure from below or an induced current, and the action of ventilators constructed for the latter purpose had recently been proved abortive. The best method of ventilating sewers, if practicable, was to have them open. If all sewers could be open impervious conduits no such gases as were now found would exist, the air in the sewers being brought to a similar condition to that of the surrounding atmosphere, and the requisite changes to produce organic matter would be absent. If engineers saw their way to have open sewers practicable, the question ended, and, when designing them, the nearer they attained this the nearer had they solved the problem.

Mr. Ashmead (Bristol), the ex-president, said he thought Mr. Clark had proved too much. He had proved that no method of ventilation had succeeded, and that the only thing that should be done now was to have open sewers. Consequently no ventilation would be required. He was not there to advocate the non-ventilation of sewers, but the Bristol sewers had been in operation ten and twenty, and some thirty years, without any complaint of the want of ventilation, and their medical officer was so satisfied that they did not require ventilation that he believed that in less than ten years all municipal and sanitary engineers would come to the same opinion. He might state that after the meeting at Bristol Mr. Rawlinson sent down Major Tulloch, who, having been taken over the works, and had some of the sewers opened for his inspection, expressed himself perfectly satisfied that ventilation was not required. Under those circumstances he (Mr. Ashmead) should be very wrong to recommend his board to spend £10,000 or £12,000 in putting ventilators in the streets.

Mr. Lemon (Southampton) said he did not think Mr. Clark intended to say that no method of ventilation had succeeded. He merely showed that if they could get open sewers it would be the very best thing to do, as an illustration of the reason why they should get as much ventilation as possible. In other words they should provide, not only ample means of letting out the impure air, but also ample means of letting pure air in, so as to provide for the proper diffusion of the gases. He had made a subterranean survey, and measured up a large amount of the Metropolitan sewer system, and he might say that he never enjoyed better health in his life. This was due to the very excellent way in which the sewers were ventilated—to the large volume of air in them in proportion to the amount of sewage matter flowing through them. He was thoroughly convinced that sewers must be ventilated as much as possible, and he thought that attempts on the part of engineers to bottle up stinks was a mere farce. They could not prevent the escape of gases. What were called sewer traps were mere delusions and snares. In nine cases out of ten they were siphons, and not traps at all; and the very best thing they could do was to make sewers and house drains as open and free as possible. He thought he could support Mr. Ashmead in one particular, and that was that there was not that necessity for the ventilation of sewers if the sewers were properly designed for their work; and he would say this of the Bristol sewers, that they were very excellent and well devised, and proportioned to the work they had to do. They had all excellent falls, and the result was that there was very little deposit at all, and as gases were only generated by the decomposition of fæcal matter, there was very little need for ventilation with a proper fall and a proper supply of water. He agreed with Mr. Clark that the death-rate in towns was in a great measure delusive. It did not follow that because the death-rate of a town was low the town was a healthy one. They should rather take what was called the disease rate. He knew that in his own town there was a very low death-rate, whilst the returns furnished by the medical officer showed that there was a very great amount of disease. They ought to ventilate their sewers, and they ought to ventilate their house drains.

After remarks from several other members in favour of open ventilation,

Mr. Ashmead said his opinion was that the thing to be done was to ventilate the house-drains and cut them off from the main sewers.

Mr. Ellice-Clark having replied, thanks were voted to him and to Mr. Hewson for their papers. Thanks were also voted to the president for the able manner in which he had conducted the proceedings, and the meeting terminated.

INTERNATIONAL CONGRESS OF SURVEYORS.

An International Congress of Surveyors, convened by the Central Committee of the Surveyors of France, was held at Paris on the 18th, 19th, and 20th July, and formed one of the series of congresses held at the Palais du Trocadéro by authorisation of the Minister of Agriculture and Commerce.

Representatives from England, Italy, Germany, Belgium, Spain, and Switzerland took part in the proceedings. In response to an invitation from the president of the Société des Geomètres of France the Institution of Surveyors of London sent three delegates—viz., Mr. E. Ryde (vice-president), Mr. Charles J. Shoppee (member of council), Mr. J. W. Penfold (honorary secretary), together with Mr. J. C. Rogers (acting secretary).

At the first day's sitting the congress was constituted under the presidency of M. Lefèvre de Lucy, President of the Central Committee of the Surveyors of France. An executive committee was next appointed, composed of vice-presidents—one nominated by each nationality—Mr. Ryde being the English representative. M. Lefèvre was then chosen, by acclamation, president of an international committee for the permanent supervision of the objects of the congress.

The second and third days were occupied in considering the various questions proposed for discussion by the French committee. These related, first, to the adoption of some guarantee of professional competency; secondly, to the comparative merits of the cadastral survey of the various countries represented at the congress, to the improvement of the methods of property registration as practised on the Continent, and to the best form for the public maps, plans, descriptions, and valuations of the various kinds of landed and house property as a basis for the equalisation of taxation.

The English delegation laid before the congress a statement descriptive of the positions and functions of the various branches of the profession in England.

In the course of the discussion the ordnance survey of England was described, as also the English system of valuation for the purposes of local and imperial taxation. English ordnance maps on the various scales were presented to the French central committee, together with copies of the published volumes of the "Transactions of the Institution of Surveyors."

The articles of discussion prepared by the French committee were (with certain modifications) accepted in the form of resolutions. The establishment of a permanent international congress, with the following representatives as a provisional committee, with power to add to their number, was agreed to:—President, M. Lefèvre de Lucy, France; vice-presidents, MM. Bucaille, Havre, France; Edward Ryde, England; Dr. W. Jordan, Carlsrhue, Germany; Paul de Jaer, Bruxelles, Belgium; Dionisio Casanal, Saragossa, Spain; Raphael Tarantelli, Teramo, Italy; and — Redard, Fribourg, Switzerland; and MM. Pottier, Villers Cotterets, Aisne; Hachet, St. Quentin, Aisne (secretaries), and Derivrif, Noyou, Oise (treasurer and editor of the *Journal des Geomètres*).

The proceedings of the congress terminated with a vote of thanks to M. Lefèvre de Lucy (the president), proposed by Mr. Ryde, and carried by acclamation. After the conclusion of the business, the foreign delegates were entertained by the French committee at a "banquet confraternel" at the French restaurant in the grounds of the Exhibition, and about 150 members assembled. The English deputation were placed on the right, the Italian on the left of the president. After dinner, M. Lefèvre was presented by the surveyors of France with a gold commemorative medal. The utmost cordiality marked the whole proceedings, and the objects for which this interesting congress took place were in every respect achieved.

On the Monday the various representatives attended at the Tuileries to confirm and sign the minutes of the congress.

ARCHÆOLOGICAL.

Alrewas and Wichnor.—The members of the North Staffordshire Field Club, and the Burton Natural History Society, visited Alrewas and Wichnor on the 20th July. In the churchyard of the former village Mr. Scrivener read an historical paper, and pointed out remains of the Norman church, and fine Early English of lower part of chancel. In the 16th century a complete clerestory was put up all round the church at one time—an unusual circumstance. There is in the church a quantity of beautiful carved woodword of the latter part of the 15th century. Some of this has been used to embellish the stalls, and many fragments are preserved in an antique chest, which is in itself one of the curiosities of the place. The nave and south aisle were carefully restored in 1851 by Mr. Christian, and the chancel in 1877 by Mr. Basil Champneys. From Alrewas the party walked to Wichnor Hall, where were seen a number of curiosities, and in the hall a full-sized model of a flitch of bacon now hangs, with an old inscription underneath relating the particulars of the presentation of a flitch on like terms to that at Dunmow. Wichnor Church was also visited, and was described by Mr. Scrivener.

On Saturday week Holy Trinity Church, Cloe, was re-opened after restoration. Mr. Fowler was the architect. The alterations have been extensive, the transept, porch, buttresses, eastern tower, and a number of seats being entirely new. In addition several new pinnacles have been added to the old tower, and a new slated roof over the nave, &c. The entire cost will be nearly £2,000. The church is Early Norman.

A new United Methodist Free Church and schoolrooms have been lately opened at Gunnislake, near Tavistock. The style is Gothic, and the building is of Cornish granite, and blue and white vitrified brick from the neighbourhood, and will seat 360 persons. The cost, including land, is about £1,100. The architect is Messrs. L. Knight and Sons, Gunnislake; the contractor, Mr. Isaac Rosekilly, Albaston, Calstock. On its completion the trustees presented the contractor with a handsome silver trowel.

The Wadham-street Baptist Chapel, Weston-super-Mare, was re-opened on Sunday week after having been enlarged and renovated. The largest make of Howorth's patent ventilator has been fixed in the centre of the main roof. The work has been performed by Mr. S. Taylor Harvey, of Weston-super-Mare. The plans were furnished by Messrs. Hans Price and Wooler, architects, of the same town. The cost of the whole will be £1,200.

The contract for the carving of the cathedral of St. Finn Barre, Cork, has been undertaken at a cost of £8,300. The amended designs, by Mr. W. Burges, for the sculpture, were submitted to the committee some time since, and were approved of. It is hoped that the west front of this fine structure will be finished at an early date, as the two towers are now erected, and little, save the carving, remains to be done.

The Thornton-with-Fleetwood School Board, at a board meeting held on Thursday, the 25th ult., appointed Mr. J. A. Seward, of Preston, as their architect for the new schools. There were ninety applications.

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ILLUSTRATIONS.

DESIGN FOR THE CHURCH OF THE ORATORY, BROMPTON—CHURCH OF ST. MARY, NORTH PETHERTON—PRINTING OFFICE AT 98 AND 99, FETTER-LANE, LONDON—SOUTHWARK DIOCESAN SEMINARY.

OUR LITHOGRAPHIC ILLUSTRATIONS.

CHURCH OF THE ORATORY, SOUTH KENSINGTON. "IN GLORIAM S. PHILIPPI."

The drawings we illustrate this week were submitted by Mr. John Kelly (Messrs. Adams and Kelly, architects, Leeds) in the recent competition. The style is Italian Renaissance. The plan consists of nave, sanctuary, and transepts, 50ft. wide, cruciform on plan, with dome at the crossing, chapels of varied size and plan each side of nave, side entrance and entrance from surrounding corridor to west side of nave. The organ and choir occupy two bays of nave on east side. Large chapel on east side of sanctuary, a wide corridor round back of sanctuary, giving communication from east and west side of church, and to sacristies and house. The chief sacristy, 50ft. × 30ft. (arranged with separate robing press for each altar in the church), with altar in recess. The interior of the nave, sanctuary, and transepts is designed with pilasters and entablature of the Corinthian order, having attic with semicircular coffered ceiling. The chapels east and west side are entered from arches resting on entablature and pilasters of the Composite order, which order is carried round the chapels at the same level, and from which spring the coffered semicircular ceilings of chapels and the arches and pendentives of the domes and lunettes of the chapels. It was intended to replace the material with which the pilasters, walls, &c., were faced with marble of various colours, as the funds would permit, as also to fill the coffers of ceilings and domes with figure subjects in mosaic, as well as the panels round semicircular ends and the sides of sanctuary. The exterior is designed in two orders, superimposed Corinthian and Composite, with balustrading and statues, and niches, &c., for statuary. The principal entrances are from three doorways into the south front, deeply recessed, to serve as porches, with double doors. Next week we shall illustrate Mr. Clutton's design.

CHURCH OF ST. MARY, NORTH PETHERTON.

The Church of St. Mary, North Petherton, is a fine example of late fifteenth-century work, with a chancel the foundation of which is of earlier date; the only remaining portions of this style are the shafts of presumably stone groining of the roof, and the earlier pitch of the chancel roof. But the whole fabric must have been so entirely "restored" by the later additions that it can only now be classed as one of the late fifteenth-century churches so well known in Somersetshire. The general scheme includes new roof to chancel, restoration of the existing nave and aisle roofs, re-seating the nave, choir stalls for chancel, but very little exterior work being contemplated. It is proposed to carry out the works as funds permit, and in separate contracts; but the estimate given by Messrs. Wall and Hook, the builders, is about £3,000 for the whole scheme. One of the principal features in the church is the wonderfully elaborate tower, which, with perhaps the exception of Huish Episcopi, in the same county, is one of the finest examples of the late fifteenth-century tower, common to this part of the county. The works will commence with the flooring and raising the sanctuary floor, and it is then hoped to commence the seating, and in the plans care has been taken to preserve all the Jacobean seats, which are of interesting design, and to place them lower by removing a huge sill, which is an idea of the early part of this century. The aim of the architect has been to preserve every portion of the old work that has not entirely fallen into decay, and the greatest care will be taken that no "new work" will be inserted where it is possible to retain the old. Mr. William Scott Champion is the architect, and Messrs. Wall and Hooke, of Brinscombe, the builders.

STEAM PRINTING WORKS, 98 & 99, FETTER-LANE.

This building is one of the earliest examples of the revival of the Jacobean and Queen Anne styles in London, having been erected in 1869-70. The premises were built for Mr. Joseph Ashton, and have been let ever since to Messrs. Speaight and Sons, the well-known printers. To meet the growing demands of their business a new story has recently been added in the curb roof shown in our illustration. It will be seen that the design is especially adapted to afford the utmost amount of light to the compositors. Mr. Gundry is the architect.

SOUTHWARK DIOCESAN SEMINARY.

This design, by Mr. A. J. Adams, for the new buildings of the Diocesan Seminary of the Roman Catholic diocese of Southwark, gained the second prize in a limited competition of six architects. The building provides accommodation for eighty inmates, students and professors. The plan is arranged so as to preserve some fine trees at present on the site, and to give views to the living-rooms over the gardens. The estimated cost was £24,000. The style is English Gothic of a collegiate type.

COMPETITIONS.

Antwerp.—An important competition at Antwerp, for the erection of a new palace of the Fine Arts, has just been decided by a jury named partly by the Belgian Government and partly by the town of Antwerp. The jury unanimously placed first the design marked "Kunst brengt Gunst," submitted by M. Jean Jacques Winders, of Antwerp, architect of the town hall of Gilly, and of numerous other buildings in Belgium; 2, "Rubens ter cere," author, M. Blomme, architect, of Antwerp; 3, "Antwerpen," author M. Van der Hegge, architect, of Brussels; 4 (bracketted together as of equal merit), "Die Treppe der Kunst sind schwer zir Steigen," author, M. Jean de Coster, architect, of Antwerp, and "Heart in a Circle," author, M. Joseph Schadde, architect, of the same town; 5, "Kunst veredelt let wolk," author, M. Ernest Dieltiens, architect, of Antwerp. With regard to the execution of the work it has been decided by the municipality of Antwerp that the authors of the five selected designs having all exceeded the sum named for the erection of the building, they will be invited to remodel their plans in accordance with the conditions of the competition and a final decision will then be arrived at.

Ashford, Kent.—The board received 29 designs from various architects in competition for the new board schools. The designs were exhibited to the public at the Assembly Rooms, Ashford, on the 10th inst. The board had several meetings to consider the designs, and on the 22nd instant they decided that the design bearing the motto "Abécédaire" should be selected for the premium of £20, and that the author thereof, whose name and address appeared, on opening the sealed paper, to be Mr. J. T. Hanson, architect, of 5, York-buildings, Adelphi, W.C., and of Dover, be appointed the architect to carry out the designs. The board also decided to select the design bearing the motto "Tuition" for the premium of £10, the author of which is Mr. W. R. King, architect, Hardinge-road, Ashford.

Bowdon.—The designs submitted by Messrs. O. Edwards and W. Owen, of Manchester and Rhyl, North Wales, have been selected in limited competition for a new Baptist chapel and shools, to be erected at Bowdon, Cheshire. The chapel is to seat 500 persons and to cost about £2,000, and will be built in the Italian style of architecture.

Leek Fever Hospital.—At the meeting of the Leek (Staff.) Improvements Commissioners on Tuesday week, the sanitary committee presented a report in which they stated that having further considered the selected plans for the proposed fever hospital, they recommended those bearing the undermentioned mottoes, in the following order of merit:—1st, "Epidemiology;" 2nd, "Cave Pestem;" 3rd, "Health;" 4th, "Esperance." This subject gave rise to a long and somewhat angry discussion. Mr. Challinor, chairman of the committee, said that, in making the final selection of the four plans which they considered the best, the committee obtained the advice of the surveyor, the medical officer of health, and the sanitary inspector, and were unanimous in placing the plan marked "Epidemiology" first. Mr. Critchlow considered that the conditions submitted to the seventeen competing architects were extremely vague and unsatisfactory. He minutely criticised the plan marked "Epidemiology," and complained that information had been given to the author of that plan which had not been afforded to the other competitors. The surveyor (Mr. Frost) said that he had estimated the cost of the four plans respectively to be—No. 1, £1,706; No. 2, £2,081; No. 3, £2,156; No. 4, £1,743. Mr. Watson said that some unpleasant reports were going about the town to the effect that although the plans had been sent in with mottoes, it was known by whom a certain plan had been drawn up. He wished to ask if it were true that it was known by any gentleman at the board or any officer connected with the board who had sent in certain plans. He thought they might fairly assume that No. 1 plan belonged to Mr. Taylor. The chairman said this was the first time he had heard of it. Mr. Watson said that no doubt the Commissioners were aware that Mr. Taylor had sent in a bill of £40 for work previously done for the board, and that it had been rejected by the finance committee. It had been stated in the town that it was two to one, if Mr. Taylor won the day, this £40 would be thrown in. That was the current report, and if that were so it was a great shame that gentlemen should have been invited to send in plans which were worth at least £200. For the honour of the board it should be made public whether or no any one knew that a particular plan belonged to Mr. Taylor. It had also been stated that a plan from the Local Government Board had been shown to Mr. Taylor which had not been submitted to the other competitors. It appeared to him, looking at the fact of this £40 bill staring them in the face, that this was something like bribery and intimidation. Two members protested that the committee had no knowledge of the author of any particular plan, and eventually Mr. Watson's amendment, that the four plans selected be submitted to the Local Government Inspector to advise the Commissioners which were the first and second best plans, was carried.

A memorial window, designed by Mr. W. Burges, architect, has been erected in St. Canice's Cathedral, Kilkenny. It has been placed in the west end of the north aisle, and represents two scenes from the life of Our Blessed Saviour. In one he is represented calming the storm, "Peace, be still," and in the other speaking the words, "Consider the lilies of the field."

The new Catholic church of SS. Peter and Paul, Kilmallock, co. Limerick, is progressing rapidly, from the designs and under the superintendence of Mr. J. J. McCarthy, R.H.A.

Alterations and repairs are about to be made to St. Mark's Church, Dublin, from drawings, &c., prepared by J. F. Fuller, F.S.A.

A new church (Roman Catholic) is in course of erection at Inchicore, co. Dublin, for the Fathers of the Order of Mary Immaculate. It consists of nave, aisles, and chancel, with four side chapels. When finished, it will have cost about £11,000. Mr. G. C. Ashlin, 90, St. Stephen's-green, is the architect.

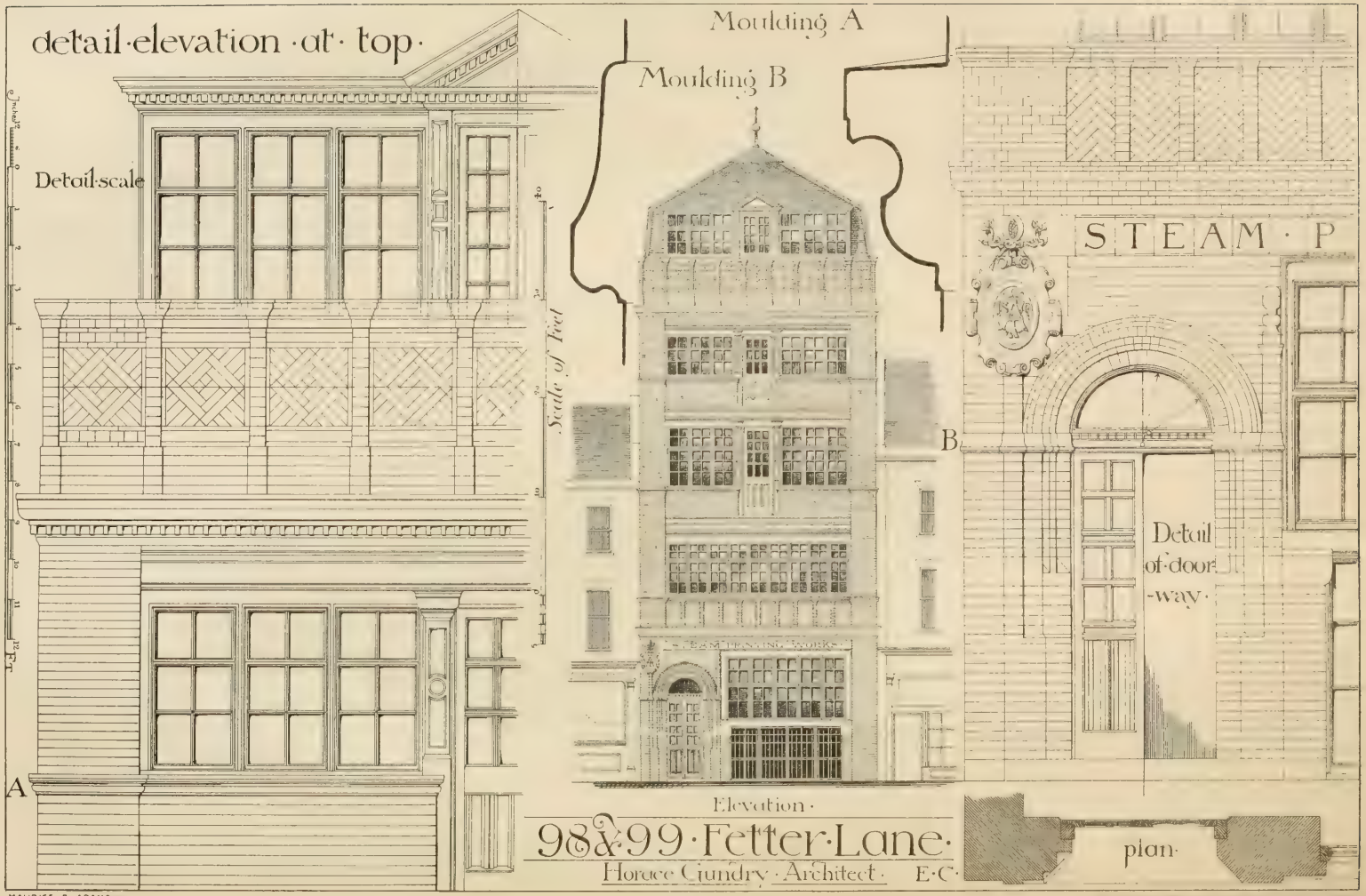
The foundation stones of a new Conservative Club were laid at Higher Ardwick on Saturday last. The estimated cost of the new building is a little over £3,000. The architects are Messrs. Slater and Kendal, of Manchester, and the contractors Messrs. Foreman and Todd, Lower Broughton.

CHURCH · OF · THE · ORATORY

BROMPTON S.W.

DESIGN BY JOHN KELLY, ARCHITECT

SIDE ELEVATION


detail·elevation·at·top·
Detail·scale
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A
Moulding A
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B
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Detail of door-way
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Horace Cundry·Architect·
E·C·
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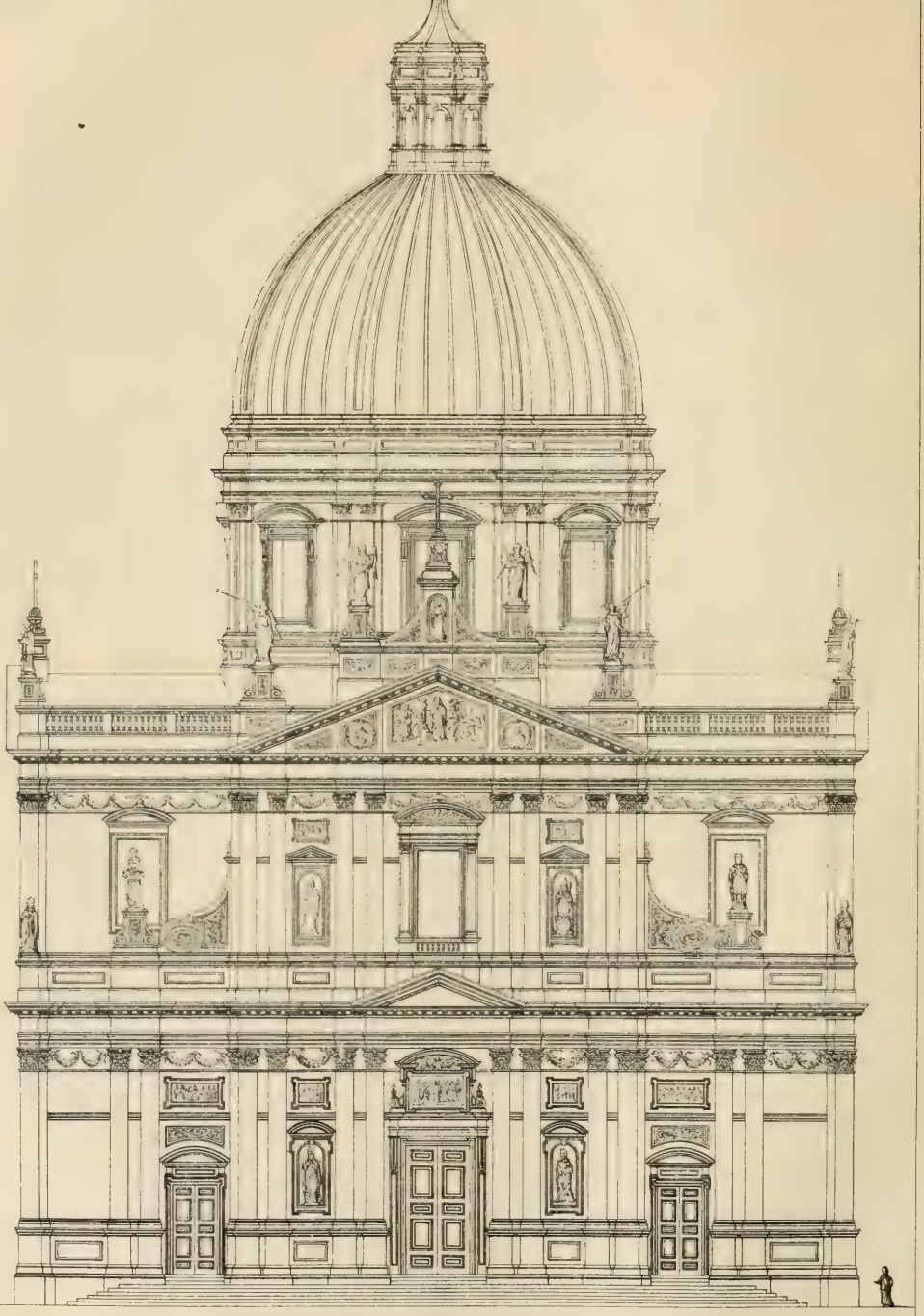
MAURICE B ADAMS del.

: CHURCH · OF · ✝ THE · ORATORY :

DESIGN BY JOHN KELLY, ARCHITECT BROMPTON S.W.



: FRONT · ELEVATION :

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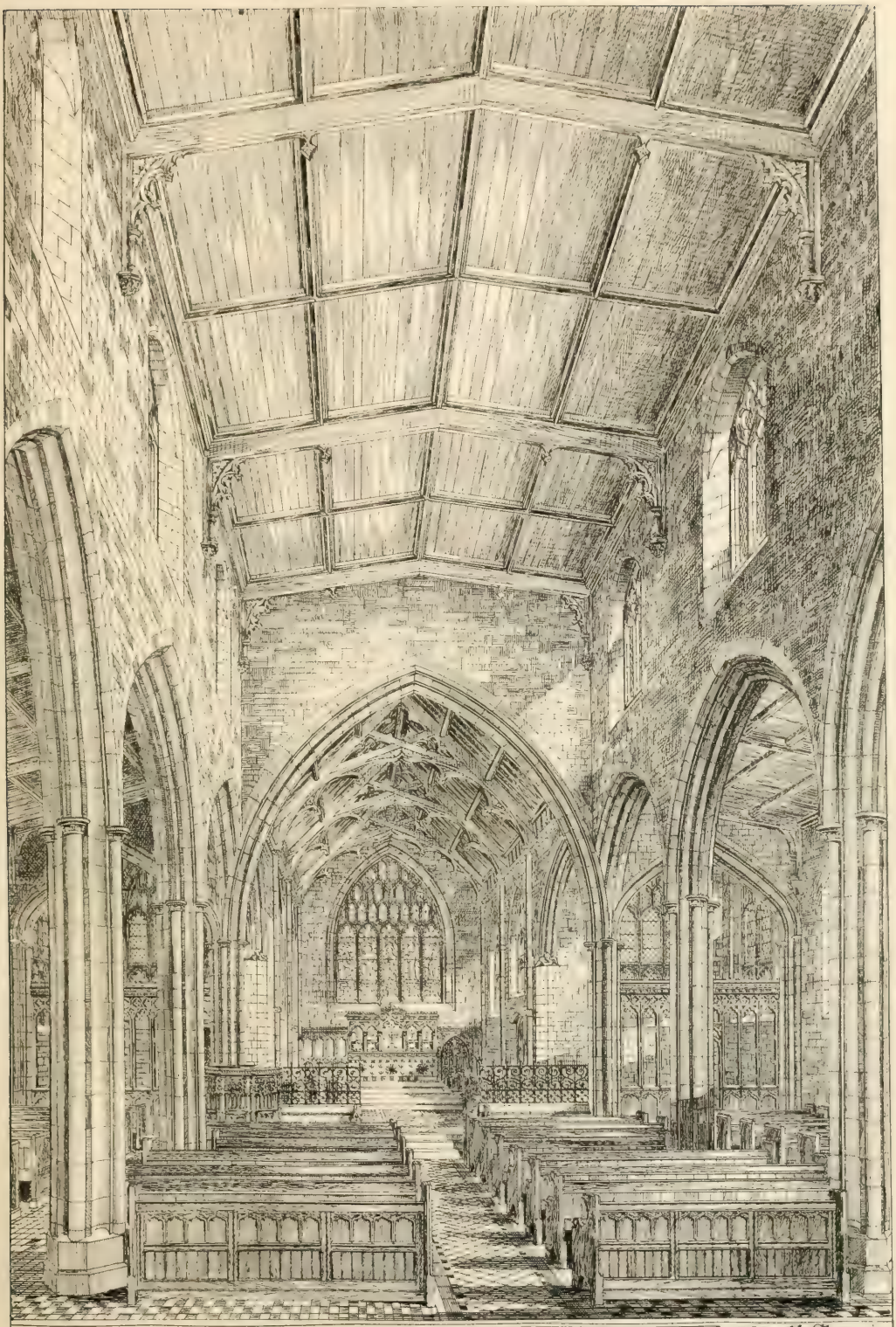
· Scale · of · Feet ·

Photo Lithographed & Printed by James Akerman, 6 Queen Square, W.C.

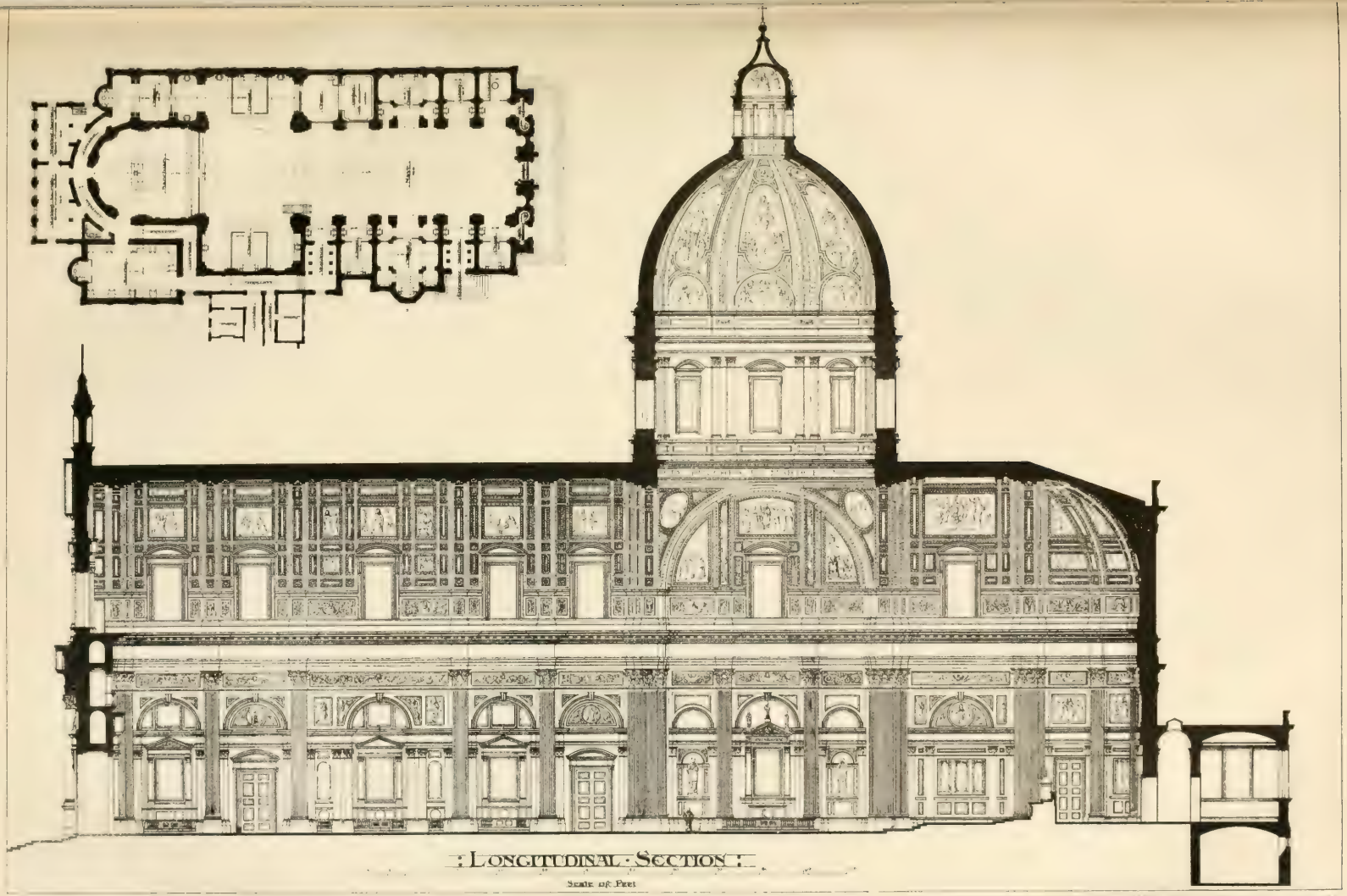


Ch·of·S·MARY·North·Petherton·Somersetshire·Restoration·Architect·W·Scott·Champion·1878·

Photo Lithographed & Printed by James Akerman, 6 Queen Square W.

SOUTHWARK + DIOCESAN SEMINARY + VIEW OF QUADRANGLE & CLOISTER +

A. J. ADAMS ARCHITECT
13 QUEENS ROAD BAYSWATER W.



: LONGITUDINAL · SECTION :

Scale of Feet

ARCHITECTURAL & ARCHÆOLOGICAL SOCIETIES.

Bristol and Gloucestershire Archæological Society.—The third annual meeting of this society was opened on Tuesday at Bristol. On Wednesday an excursion was made to Westbury, Henbury, and Almondsbury; and an evening meeting was held at the Bristol Museum, when Alderman Fox read a paper on the "Ancient Guilds of Bristol." This was followed by several papers, purely archæological, and dealing for the most part with local matters, and, in conclusion, Mr. J. T. Irvine read a paper on the Roman remains at Berkeley, and some relics at Cirencester. He first referred to some bases of columns of Roman work that were found worked up into a sort of box of bricks and stone at Berkeley. The box itself was not very old, but the stones of which it was made were exceedingly old Roman work. Sketches of these and some old monumental slabs in the church were exhibited, together with sketches of a remarkable side-table and stand found at Cirencester; also part of the cornice of a temple that must have been finer than any at Bath, and apparently earlier in date and of purer style. Mr. Irvine believed that a person residing at Cirencester might readily reconstruct the cornice from the fragments in the Cirencester Museum.

Kent Archæological Society. — The annual meeting of this society was held on Wednesday at Bromley. Earl Amherst, who has for many years been the president, was re-elected, a considerable number of new members were admitted, and a prosperous balance-sheet was exhibited. The members then proceeded to Chislehurst Church, which has been restored. The chief object of attraction was the monument to the murdered Bonars, with the curious inscription which Mr. Gladstone once referred to in the House of Commons, in which it is stated that the husband and wife had long wished to die at the same moment, and that this wish was accomplished unexpectedly by the murderous hand of one of their domestics, who was duly executed for the crime, and whose skeleton long remained in Dr. Ilott's surgery at Bromley. The archæologists next drove through Scadbury park to Frognal, the seat of Earl Sydney, where Queen Elizabeth visited Walsingham, her famous secretary. Having inspected the collection of historic pictures and medallions, the archæologists partook of luncheon. Progress was next made to King John's Palace, at Eltham, of which, however, nothing remains but the ancient hall. Mr. Wollaston pointed out its beauties and peculiarities, and also narrated its past history. The bridge across the moat was acknowledged as a splendid specimen of mediæval construction.

The Leicestershire Architectural and Archæological Society.—The summer meeting of this society was held at Cambridge, on the 16th and 17th ult. The members and friends assembled at the University Arms Hotel on the morning of the 16th, and first visited the various collections of pictures, statuary, engravings, mediæval illuminations, Greek coins, and local Romano-British antiquities in the Fitzwilliam Museum, throughout which they were conducted by the director, Professor Colvin. After luncheon they were escorted through the chapel, hall, library, &c., of Peterhouse, where the stained glass of the fifteenth-century east window commanded general attention, as did likewise the painted window recently added from the designs of Professor Ainmüller, of Munich. At the adjacent church of St. Mary the Less the vicar was in readiness, and pointed out the architectural features. The next point made was Queen's, the college of Erasmus, where Mr. Clark and the Rev. A. Wright guided through the gardens, chapel hall, and library of their Old House, which bears a striking resemblance to Haddon Hall, both in its ground-plan and its internal arrangement. In the library, amongst other treasures, there was shown a noble folio manuscript of St. Augustine, and a very interesting transitional Prayer-book issued in the reign of Henry VIII. Thence passing through the quadrangle of St. Katherine's College, the visitors entered the library of Corpus Christi College, passed through the ninth-century tower and restored church of St. Benedict, attended evensong in the chapel of Henry VI., and afterwards inspected the curious passage between the ceiling and the roof. The next day began with a visit to Gonville and Caius College, where Mr. Bensly, fellow and librarian, commented upon the portraits and other treasures of the hall, combination-room, and library. Similar attention was received from Mr. Atkinson at Trinity Hall, where the original method of securing books to the library desks was shown and explained. After a few minutes under Dr. Luard's guidance in Great St. Mary's Church, Mr. Bradshaw (University librarian) exhibited and commented upon some of the most notable manuscripts and early printed books in the University library, and after a few moments in the Senate House, the party proceeded to Trinity College, where they were received by Mr. Cobb, senior fellow, and the Rev. R. Sinker, librarian of the college. Full justice was done to the noble series of portraits which adorned the chapel, and to the wondrous tones of the organ. The Rev. Professor Mayer and Professor C. C. Babington gave a lucid history of the architecture of St. John's College in its various stages, and especially of the new chapel by Sir Gilbert Scott, and of its predecessor. Early college plate and service books were also shown. After luncheon Mr. Pattrick exhibited and explained the most notable books and engravings in the Pepysian library, whence, after viewing some traces of old Camboritum and the later fortifications of Castle-hill, the visitors inspected the very early Norman Church of St. Peter, and its modern neighbour, that of St. Giles, and concluded their afternoon with the School of Pythagoras and a glance at Milton's mulberry tree in the gardens of Christ's College.

A glebe-house is being built at Killesk, according to the plans of Mr. J. F. Fuller, F.S.A., who also designed the new church adjoining.

The Rev. Canon Finlayson is at present preparing a book for press on "The Ancient Monuments in Christ Church Cathedral" (Dublin), which, it is expected, will possess much interesting matter from an antiquarian point of view.

The works in connection with the "Christian Union Buildings," Lower Abbey-street, Dublin, are being hurried on to completion with all possible speed, so that they may be completed within the time specified in the contract. Messrs. M. Gahan and Sons, Harcourt-street, are the contractors for the work; Mr. Alfred Jones being the architect.

A vicarage house is in course of erection for the benefice of Kirby Moorside, near York, at a cost of £2,000, from the designs, and under the superintendence, of Mr. J. Mitchell Bottomley, of the firm of Messrs. Armfield and Bottomley, architects, of Middlesbro'-on-Tees and Whitby; the contractor is Mr. Thomas Wood, of Pickering.

A new swimming bath was opened at Bridgnorth on Tuesday week. It has been built from drawings supplied by Mr. George Fletcher, of Bridgnorth, who has superintended its construction. The bath is 40ft. by 17ft., with a depth varying from 2ft. 6in. to 4ft. 6in., having platforms arranged to allow access to the open river. It is built upon pontoons extending the full length.

The death is announced of Mr. Thomas Oldham, LL.D. (Dublin), F.R.S., the well-known geologist. From 1846 to 1851 Professor Oldham was chief of the geological survey in Ireland, and from 1851 to 1876 he held a similar appointment in India, and was also director of the Geological Museum of Calcutta.

On Friday the new wing was opened of the convent of Sisters of Charity of St. Vincent de Paul, Carlisle-place, Westminster. The new wing is built from the designs of Mr. Henry Clutton, of five stories, with large basement. It contains large work-room, a chapel some 20ft. longer than the present one, and two large dormitories extending the whole length of the building, providing accommodation for 50 additional inmates. These rooms are light, lofty, and well ventilated.

A new Congregational chapel is about to be built near the Rother-market, Stratford-on-Avon. The designs are Gothic, and were prepared by Mr. H. J. Paull, of London and Manchester. The tender of Messrs. Roberts and Son, of Stratford, has been accepted at £2,970, and £274 for lecture-hall, and the work will be commenced at once. The chapel will seat 400.

The new church of All Saints, Middlesbrough, recently erected from designs by Mr. Street, R.A., was consecrated by the Archbishop of York on Monday.

A new church is about to be built at East-the-Water, near Bideford, from the designs of Mr. Bryden, at an estimated cost of £1,500.

Building Intelligence.

Alphington. — The parish church of Alphington, South Devon, was re-opened on Thursday week, after restoration by Messrs. Stephens and Son, of Exeter, under the direction of Messrs. Hayward and Son, architects, at a cost of £4,500. The walls of the south aisle have been almost entirely rebuilt, the chancel has been lengthened, and the piers and arches have been restored to the perpendicular. The roofs of the church are entirely new, the old floor has been taken up, the vaults filled in, and a bed of concrete laid under the new floor to prevent the rise of exhalations from the human remains beneath. The old gallery, which extended across the whole width of the church, has been removed, and the tower arch opened to view. The other alteration made is the erection of a vestry on the south side, with a loft over it for a large organ. The steps in the sacrarium are of Devonshire marble, the floor being laid with Godwin's tiles. The upper part of the porch had to be rebuilt, and as there were evident traces of the existence of a former niche, it was determined to build a new one, which has been filled by a statue of the patron saint, executed by Mr. Harry Hems. The wood and stone carving, except the statue of St. Michael, has been done by Mr. Sendell, of Exeter.

Ashton-under-Lyne.—The new church of the Holy Trinity, Ashton-under-Lyne, was consecrated on Wednesday week. The church has been designed and superintended by Messrs. Medland and Henry Taylor, of Manchester, and the works have been carried out by Messrs William Storrs and Co., Stalybridge. The cost, £11,000 to £12,000, includes the boundary fencing to church, vicarage, and schools. The church will seat 760. The plan presents some unusual features. The aisles are continued right round the chancel, which is apsidal, with nine arches between the chancel or choir and the surrounding aisle. The church consists of a broad nave, 26ft. across, with north and south aisles, each about 15ft. wide, also a western lean-to aisle (or narthex), divided into three parts—viz., a north west and a south-west porch, and between them a baptistery, with windows on the north and south sides looking into the porches. There are three narrow arches at the western end of the nave, resting on four granite pillars; an arch, of the same width as the three at the west end, on each side of the nave, forms the first and short bay. There are, on each side of the nave, four other larger and loftier arches opening into the aisles. The style is Early Pointed, and the material red brick, with stone dressings. The chancel paving was supplied by Mr. W. Godwin, of Withington, and all the painted windows are by Messrs. Heaton, Butler, and Bayne.

Bolsover.—The re-opening of the parish church of Bolsover took place on Tuesday, July 16th. The church, which was in a very deplorable state, has been thoroughly restored. The additions made consist of a large north aisle and arcade, and entire new roofs throughout (the architect was anxious to preserve the low 15th century roof over the nave, but it was found to be in such a state of decay that it was impossible to do so), re-building the chancel arch, adding an organ chapel, and the complete renovation of the chancel, which is fitted with oak stalls, stone credence table and sedilia, and a reredos of Bath stone, with crocketted canopies. The floor is laid with tiles of simple design. The whole of the seats are of deal, stained. The roof is covered with red Staffordshire tiling. The work has been well carried out by Messrs. Shillitoe and Morgan, of Campsall, near Doncaster, under the superintendence of the architect, Mr. J. D. Mitchell-Withers, of Sheffield. The total cost is expected to be about £6,000.

Chester.—On Thursday week a new Nisi Prius Court was opened at Chester. Mr. T. M. Lockwood, of Chester, is the architect. The style adopted is the Doric, which precludes side windows; pilasters of that order divide the walls into compartments. Along the top of the pillars runs an entablature, above which are a series of semicircular arches forming recessed

panels in the wall, and from above these the roof is carried. The builder is Mr. Samuel Warburton, of Manchester. The court affords accommodation for 250 persons engaged in the business of the court, and 200 spectators. The cost is about £12,000.

Haughley, Suffolk.—The completion of restoration of the interior of the parish church of St. Mary was celebrated on Thursday week. The church is chiefly Early English, and consists of chancel, nave, and south aisle, with tower at the west end of the aisle. The fine oak roof of the nave was restored 8 years since, the sum then expended being £400, and this has been followed by the entire restoration of the chancel, where are new benches and reading desks as well as a new oak roof. This work has cost £400. In the nave the ugly old pews, which faced in all directions, have been removed, and their place taken by oaken benches. A new vestry chamber has been built, the floors of both nave and chancel laid with Minton's tiles, and the communion table—of oak—is new. The cost approaches £1,200, and the work has been carried out by Messrs. Ludkin and Sons, Banham, Norfolk, the architect being Mr. Frere, of London.

Incorporated Church Building Society.—The Incorporated Society for Promoting the Enlargement, Building, and Repairing of Churches and Chapels held its last meeting for the present session on Monday, July 15th. Grants of money were made in aid of—Rebuilding the churches at Radstock, near Bath; Upton Noble, St. Mary, near Bath. Enlarging or otherwise improving the accommodation in the churches at Ampney, St. Peter, near Cirencester; Avebury, St. James, near Calne, Wilts; Ilchester, near Taunton; Kenfig, near Bridgend, Glamorgan; Rodney Stoke, near Weston-super-Mare; and Wells, St. Cuthbert, Somerset. Under urgent circumstances the grants formerly made towards the enlarging and restoring the churches at Huish, near Marlborough, Wilts, and South Normanton, near Alfreton, Derby, were each increased. During the session thus concluded, the sum voted by the society in aid of the various works brought before them has been £12,471.

Kensal-green.—St. Jude's, Queen's Park, to be opened to-morrow, forms the chief feature of a group of buildings to be hereafter completed by the addition of a parsonage-house. It is in the Early English style; stock bricks, with red bands and arches, being used throughout, and the whole covered with a tile roof, 50ft. high at the apex. All the sittings in the church are placed in the nave under a roof of 40ft. span, the nave being separated from the aisle passages by a well-proportioned arcade, thus affording to every member of the congregation a view of the pulpit and reading-desk. The building is lighted principally by a clerestory and aisle windows, with a large four-light window at the west end. The church contains 800 sittings, and has been erected at a total cost of £6,000, inclusive of tower and spire, but exclusive of boundary wall and font, by Mr. Wheeler, of Highgate, under the personal superintendence of Mr. John T. Lee, of 15, Great James-street, Bedford-row, W.C. The pulpit is executed in Calne stone, with marble columns, selected from various quarries, and has been given by the widow of the late Mr. Benjamin Shaw.

Metropolitan Board of Works.—At the weekly meeting of this board, on Friday, the tender of Messrs. Easton and Anderson was accepted for additional pumps at Crossness and the Effra and Falcon-brook outlets at £7,700, and a schedule of prices for ironwork. For the formation of a sewer and carriage and footways in the line of the improvement from Shoreditch High-street and Gibraltar-gardens, Messrs. Nowell and Robson's tender at £19,490 was accepted. This was the lowest tender but one of eight received. It was agreed to erect ten ventilating pipes, with cowls, in Lower-road and High-street, Deptford, in order to obviate the nuisance caused by effluvia from the low-level sewers. The works committee submitted a lengthy report, of which the following is the official abstract printed on the agenda paper:—"From the facts and circumstances which have come to the knowledge of the committee, relative to the past and present interested connection of Mr. Joseph Storey, the representative at this board of the parish of St. Luke, with property in that parish, required for the board's improvement scheme in Whitecross-street, under the Artisans' Dwellings Act, and for the local improvement in Golden-lane, now being carried out by the same vestry, and to the cost of which the board have agreed to contribute a moiety; and from the fact that a claim is now before the committee, signed by Mr. Storey and his co-adventurers, demanding a sum of no less than £47,052, in respect of property in which he is largely interested, the committee are of opinion that Mr. Storey's duties, as a member of the Metropolitan Board of Works, are in complete conflict with the private interests of himself and of his co-adventurers, and that his conduct in relation to the properties in question is calculated to reflect discredit upon local self-government." A memorial was presented, signed by 31 out of 48 members of St. Luke's vestry, expressing confidence in Mr. Storey's integrity, and sympathy with him under the attack of a covert enemy. Mr. Storey entered at great length into the circumstances connected with his purchase of small properties in St. Luke's, and urged that he had done nothing to enhance the value of his houses since an official representation had been made with reference to some of them, and that it would be unfair to prevent him from dealing in property because he had been elected chairman of the improvements committee of the vestry. He should decline to withdraw from the board if the resolution were passed. Mr. Richardson stated that the facts embodied in the report were all taken from Mr. Storey in his explanations, and urged the desirability of passing the resolution, although the board had no power to compel Mr. Storey to withdraw. Mr. Freeman said the fact was, Mr. Storey was one of a syndicate of three members of St. Luke's vestry, who had been buying and transferring property which it was proposed to acquire for public purposes; that being so, unless the Metropolitan Board took action in the matter, the public might regard it as not above suspicion. The resolution was carried by the assent of 28 out of 32 members present—the other four (including Mr. Storey) not voting. An application on behalf of the Sunday School Union for the appropriation of a site on the Victoria Embankment for the purpose of erecting thereon a statue to the memory of Robert Raikes, the founder of Sunday schools, was referred to the works committee. In consequence of the retirement of Mr. W. Newall, Mr. C. W. White was appointed principal clerk in the superintending architect's department; Mr. G. J. Thomas being appointed to discharge the duties heretofore performed by Mr. White in the dangerous structures office; and Mr. A. J. Bailey to take Mr. Thomas's place.

Osbaldwick.—The parish church of Osbaldwick, near York, was re-opened last week after restoration, under the care of Mr. Jno. O. Scott. The internal fittings, which were of the most inconvenient description, have been entirely removed, and the nave is now provided with open seats of oak. A new font of Caen stone, plain and Norman in character, has been fixed at the north end of the nave. The ceiling is lofty and waggon-headed, the rafters, which are stained and varnished, being so fixed as to form panelling, the spaces between which are of plaster work. The roof has been strengthened by iron beams which extend from wall to wall. A new porch has been erected at the south side of the nave; and on the north side of the chancel a new vestry has been built. The roof is covered in with red Staffordshire tiles, and there is a cresting of the same material. The west wall of the nave has been surmounted with a bell turret, extending to the height of 12ft. above the cresting of the roof, and in this are a couple of bells. The estimated cost of the restoration is £1,400.

South Bermondsey.—On Saturday last the Bishop of Rochester consecrated the chancel and two bays of the nave of St. Augustine's Church, Lynton-road, Bermondsey. The portion already completed covers an area of about 80ft. long by 60ft. wide. It consists of chancel of three bays, and two bays of the nave, with north and south aisles; the chancel in addition to wide aisles on the north and south sides has an ambulatory at the eastern end. The style is 13th century Gothic of English character, the chancel having a square termination with three arches opening into the ambulatory, and three windows above—that in the centre being of three lights—the sides being of two lights. Owing to the ground on which the church is built being considerably below the level of the road along the north side, and the soil being peat for some depth, it was thought desirable to form a crypt under the whole of the building. A groined ceiling has been constructed of cement concrete at a height of 14ft. from the crypt, which forms the floor for the church. The chancel is 40ft. deep and 27ft. wide; it is vaulted with red brick to a height of 46ft.; the portions adjoining the western bays of the chancel on the north and south sides are 13ft. wide, in which seats are placed. The organ, built by Messrs. Bevington, is on the north side under the tower; the seat for the organist is in a balcony under the arch opening into the chancel. The vestries, which are not yet built, will be on the north side of the chancel; that for the clergy will adjoin the chancel aisle; that for the choir will be in the crypt below, reached by the turret stair, which has concrete steps. The nave will be 77ft. long, in five bays, 35ft. high to the wall plate, with a narthex 17ft. wide, and a large porch facing the road. The font, which is of red Dumfries stone, will stand in an octagonal baptistery at the south side of the narthex. The walls are faced with red bricks, with masonry of Bath stone, and Dumfries stone piers. The nave will be the same height, and width, as the chancel, aisles 13ft., wide and 13ft. high to the wall plate. The benches, which, at present, accommodate 460 persons, are of deal, stained black. The church will seat, when finished, about 1,000 adults, and all the sittings will be free. Messrs. Henry Jarvis and Son, of Trinity-square, Southwark, are the architects.

Whitley.—The new buildings of the Prudhoe Memorial Convalescent Home, at Whitley, were opened last week. The home was originally planned to accommodate about 70 patients; but the architect (Mr. Thomas Oliver, of Newcastle), made provision in the administrative department for the effective working of the institution, should more accommodation at any time be added. Additions have been made to the building, by which accommodation is provided for nearly 50 patients, and now about 120 patients can be admitted. The works have been carried out in stone throughout, and harmonise with the existing buildings. The whole cost has been about £3,000. The new rooms are warmed by Messrs. Barnard and Bishop's patent slow combustion ventilating stoves. Mr. Yates has acted as clerk of the works.

Winterton, Norfolk.—This church was re-opened on the 9th instant, by the Lord Bishop of the diocese. The nave and chancel have been restored at a cost of about £3,000; a further sum of £1,500 is still required to complete the restoration of the fine Transition Decorated and Perpendicular tower and porch. The work has been carried out from designs and under the superintendence of Mr. Herbert J. Green, the architect, of Lincoln's Inn-fields, London, W.C.; the builder being Mr. Hubbard, of East Dereham.

A memorial has been presented to the Earl of Beaconsfield by a number of gentlemen professionally interested in the promotion of higher education in London and its vicinity, representing their strong conviction of the importance of giving increased prominence to the study of ancient art as a branch of classical training, and asking the Premier's assent to the proposal to establish a museum of casts from the antique, with provision for the delivery of lectures upon the history of Greek sculpture, to be illustrated from the casts and from the collections in the British Museum.

An altar to Our Lady with a reredos have been erected in the lady chapel of St. Peter's R.C. Church, Scarborough. The work is elaborately sculptured in Caen stone with alabaster columns, and has been executed by Mr. Earp, of London, from the designs of Mr. Goldie, the architect of the church. Messrs. Hart, Son, Peard, and Co. have just completed new chancel gates, in brass and iron, also from Mr. Goldie's designs.

The chancel of Brewood Church, Staffordshire, is about to be restored, and the east window filled with stained glass as a memorial to the late incumbent.

More than Fifty Thousand Replies and Letters [illegible] have appeared during the last [illegible] in the ENGLISH MECHANIC AND WORLD OF SCIENCE, [illegible] Scientific and Technical Authorities of the day. [illegible] respecting all new scientific [illegible] its pages, [illegible] for [illegible] to be brought under [illegible] workers and amateurs. Price Twopence, of all booksellers and newsvendors. Post free 2½d. Office: 31, Tavistock street, Covent-garden, W.C.

TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.]

All letters should be addressed to the EDITOR, 31, TAVISTOCK-STREET, COVENT-GARDEN, W.C.

TO OUR READERS.—We shall feel obliged to any of our readers who will favour us with brief notes of works contemplated or in progress in the provinces.

Cheques and Post-office Orders to be made payable to J. PASSMORE EDWARDS.

ADVERTISEMENT CHARGES.

The charge for advertisements is 6d. per line of eight words (the first line counting as two). No advertisement inserted for less than half-a-crown. Special terms for series of more than six insertions can be ascertained on application to the Publisher.

Front Page Advertisements and Paragraph Advertisements 1s. per line. No front page or paragraph Advertisement inserted for less than 5s.

Advertisements for the current week must reach the office not later than 5 p.m. on Thursday.

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(Payable in Advance.)

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N.B.—American and Belgian subscribers are requested to remit their subscriptions by International P.O.O., and to advise the publisher of the date and amount of their remittance. If the last-mentioned precaution is omitted, some difficulty is very likely to arise in obtaining the amount. Back numbers can only be sent at the rate of 7d. each, the postage charged being 3d. per copy. All foreign subscriptions, unaccompanied by an additional remittance to cover the extra cost of forwarding back numbers, are commenced from the next number published after the receipt of the subscription.

Cases for binding the half-yearly volumes, 2s. each.

RECEIVED.—T. B. I. Co.—S. Bros.—B. of P.—W. T. G.—T. H. C.—G. E. and Co.—McG. and Co.—S. S. and O.—W. H. S. and S.—T. and R. B.—H. V. and J.—W. C.—M.—H. C. and Co.—T. R. and Co.

OUR COMMONPLACE COLUMN is crowded out by the pressure on our space, caused by the proceedings of the Royal Archæological Institute.

PUPIL. (No.)

Correspondence.

RYE CHURCH RESTORATION.

To the Editor of the BUILDING NEWS.

SIR,—A paragraph appearing in your columns last week in reference to the proposed restoration of Rye Church, I may, perhaps, be allowed a small space (as a Churchman, and one who was born and bred in the town, and is still deeply attached to the church of his baptism, &c.), to say a word or two.

I cannot help feeling, with many other art-lovers, that this restoration mania, though healthy in itself, is often of too sweeping a character to command the respect which it otherwise should; and a case in point, amounting to rebuilding, now going on at Baxhill (within 20 miles of Rye) cannot tend to allay the worst fears of those who have any feeling for their fine old parish church.

However, in the "master" hands of an artist like Mr. Street, we may place more confidence than in many another well-known restorer, and trust to his having that veneration for ancient work which will prevent him pulling down a single stone merely to rebuild.

In the case of Rye it would only seem necessary (as regards the fabric) to replace all ugly wooden windows with characteristic stonework, &c., as also all doors, &c., and leave all string-courses and other masonry, though partially time-worn or defaced, to tell their own tale—merely replacing such work as is absolutely requisite for the stability of the structure.

As regards the interior, a similar treatment, including the removal of all unsightly hoardings and barriers, with the ugly and unseemly "pens" and "three-decker," and the substitution of more appropriate fittings, and the getting rid of every vestige of whitewash, and the careful restoration of paving, and substitution of open roofs for flat ceilings, with the opening up and proper treatment of all disused or abused chancel aisles, &c.; and, of course, attending to any "making good" after the removal of these barbarous appendages, would seem to include all that is necessary in the opinion of others besides ARCHITECTON.

MANCHESTER SOCIETY OF ARCHITECTS' TRAVELLING STUDENTSHIP.

SIR,—In reply to a letter inserted in the BUILDING NEWS of July 20th, I beg to state (as the successful competitor in the above competition) that my drawings were sent in at the time fixed, but were unfinished.

Shortly after delivering them I was kindly informed by the honorary secretary of a certain extension of time, allowed, I understood, to all the students—at any rate, to the competitor who claims "Injustice." Seeing that the time allowed was the same for both, I fail to see but one difference between us—namely, that I made the best possible use of the valuable time thus offered, whereas "Injustice," according to his letter "found the time simply useless to him," and sent his drawings back again in a few days. Then he tells us why the extension of time was useless, and the answer he gives is, "because his drawings were already complete"—*i.e.*, finished, I suppose—so perfectly, indeed, that no other finishing touches were necessary.

Where, and on what foundation, then, does he claim "Injustice?"

I may say in conclusion, that I have not had the pleasure of closely examining his drawings.—I am, &c., J. NIXON HORSFIELD.

Florence, Italy, July 27, 1878.

SIR,—It is very easy to understand that an unsuccessful competitor feels some disappointment at his non-success, but I regret that Mr. Holden imagines that it was this that prompted my letter. I could bear pure disappointment patiently, but when a competition is conducted, to say the least, in a most loose manner—as Mr. Holden's remarkable statement respecting extension of time proves—it is equally easy to understand that the result must create dissatisfaction. This is my grievance.

I do not for a moment dispute the actual correctness of the award, although had all the competitors had equal advantages it is possible the result might have been different; but I do dispute the right of a committee to deal with so little consideration to competitors.

An architectural body above all others should be explicit and decisive in their conditions. If an extension of time was intended, it should have been officially and simultaneously notified to every competitor.

I feel sure that if Mr. Holden will calmly consider the matter, and apply the circumstance to himself, he will perfectly understand, if not appreciate, my annoyance.

As to an apology, his letter has done anything but convince me that one is due from me, but rather I think it should come from the other side.

In conclusion, I trust that, should there be another competition next year, the conditions will be more carefully prepared.—I am, &c.,

Manchester, July 30. FRANK L. ELTON.

BODMIN TOWN-HALL COMPETITION.

SIR,—Perhaps "An Outsider" will kindly explain the following discrepancies between the conditions and the accepted plan:—

Conditions.	*Accepted plan.*
Engine-room under hall.	Hall being, as in no other plan, by means of excavation, on ground floor. No engine-room under. No engine-room provided by plan at all.
A hall, with a justices' room retiring therefrom.	Justices' room retiring from council chamber. Entirely cut off from hall.
Offices for town clerk.	Only one office provided, and that quite inadequate.

If this is the best plan, why is it contemplated to alter it? I have it on good authority that the five minutes' inspection was carried on with *closed* doors.—I am, &c.,

A COMPETITOR.

THE GRINDING SYSTEM.

SIR,—The Southport Corporation have advertised in the London professional newspapers for an assistant in the borough surveyor's office, who must be an experienced surveyor and leveller, at a salary of £120 per annum; but in consequence of the very large number of applications for this situation, they have actually again re-advertised the berth at 40s. per week wages. Taking advantage of hard times in this fashion is quite a new and strange one, and I sincerely hope that all of my brethren are in a position, like myself, to hold out a little longer, and at once withdraw his letter of application.—I am, &c.,

ONE WHO APPLIED.

CHIPS.

Dr. Eason Wilkinson, a well-known Manchester medical man and sanitarian, died on Friday last.

On Monday week the memorial stone of a new Baptist chapel was laid at Denton. The new building will be of brick, with stone dressings, and a plinth of blue bricks. The seats, which will be open, will accommodate 150 persons. The plans were prepared by Mr. J. Ingman, Hazlewood road, Northampton, and the builders, Messrs. Robinson and White, Denton, have contracted to build the chapel in twenty weeks for the sum of £387.

Monseigneur Dupanloup has issued a stirring appeal for subscriptions to illustrate Joan of Arc's career by ten painted windows in the Orleans Cathedral, and to restore the old expiatory monument, in which he says: "To us Joan of Arc is a warrior, a victim, and likewise a saint; but as it appertains to the Church alone to adjudge her this grand title of saint, twelve of my venerated colleagues and I a few years ago addressed the request to the Holy See. We then opened at Orleans the preliminary investigation required by the Canon Laws; the Court of Rome has now that investigation in its hands, and we await with confidence its decision." A jury will choose the best plan, and the cost is estimated at 150,000f.

A young men's institute was opened at Stoke, Ipswich, on Thursday week. It is of brick, heated by stoves; the chief room, 37ft. by 20ft. Mr. Girling, of Ipswich, erected the building, at a cost of about £300.

A new Wesleyan chapel is about to be erected at Acomb, near York, at a cost of £1,600. The building, which will be in the Gothic style, with pressed brick fronts and stone dressings, will accommodate upwards of 300. The interior dimensions will be 50ft. by 30ft. A school-room, 29ft. 6in. by 22ft., with two class-rooms, will be attached. Mr. Anderson, of Lendal, York, is the architect; Messrs. Keswick and Son will do the brick and stone work; and Mr. R. Gray, the joinery.

The Edinburgh School Board, on Thursday week, appointed Mr. Wilson, their superintendent of works, as architect to the board, at the present salary of £150, and a commision of 3 per cent. on new works.

A new coffee and cocoa-house was opened in Regent-street, Leamington, on Wednesday week. The alterations have been carried out by Mr. Fell, builder.

A party of about a dozen members of Parliament visited the A B C Sewage Company's works at Aylesbury, on the 13th ult., to see the process of precipitation at work. Experiments wree exhibited by Mr. C. Rawson, managing director, showing the rapidity of the clarification of sewage by the admixture of blood, charcoal, and clay, and subsequently with alum; and then the party were shown the tanks where the deposition of the sewage matter goes on, previous to its being pumped up, and pressed dry into cakes for manurial purposes.

The parishioners of Coddenham, near Ipswich, £100, for repairing and rehanging the peal of eight have accepted the estimate of Mr. Day, of Eye, of bells (including the recasting of two) in the parish church. When restored it will be the lightest eight-bell peal in Suffolk.

A new Primitive Methodist chapel has been opened at Frodsham. Mr. T. Davis was the sole contractor.

The Liverpool School Board have accepted the tender of Messrs. Brown and Backhouse for the erection of schools for 1,060 children in Clint-road. The schools are from the designs of the architect to the Board, Mr. T. Mellard Reade, C.E., F.R.I.B.A. They consist of four departments, the infants and mixed juniors being on the ground-floor, and the senior boys' and senior girls' on the first-floor. The principal façade is to the north, the plan being of a ⊥-form. A plunge bath is provided in the basement, the playgrounds are spacious, being the largest of any of the Liverpool Board Schools. Ten and a half superficial feet per child is allowed for floor space. The contract amounts to £9,090, or £8 11s. 6d. per head.

The first new schools erected by the Cardiff School Board were opened on Wednesday last. Messrs. James, Seward, and Thomas, of Cardiff, are the architects. The buildings are situated in Eleanor-street, and are in a Gothic style of architecture.

Intercommunication.

QUESTIONS.

[5456.]—**Cross at Rouen.**—When in Rouen last week I noticed, on a small open space between the Museum of Antiquities and the School of Medicine and Pharmacy, a large memorial cross, much resembling the well-known Eleanor crosses at Northampton and Waltham. It is of freestone, about 10ft. in height, and divided into three well-marked stages with vacant canopied niches on each of four sides, the whole finished by a palpably incongruous cross. The style of carving somewhat resembles that of the Edwardian English period, but the work is roughly executed. I made inquiries in the neighbourhood, and was told the monument had been removed from the Place St. Hilaire. Can any reader give the history of this structure?—E. W. P.

[5457.]—**Worm in Red Deal.**—Can any of your readers inform me of the best or any method to be adopted to stay the progress of the worm in red deal flooring? The floor in question is in a large drawing-room that had remained unfinished for a period of 35 years, and during that time the flooring was cut down and laid on the joist face downwards. Some 12 months since the board was turned over and laid, and the floor finished, as the boarding had become blackened, and was laid before it was planed; it was not noticed the worm had attacked the edges of it. Can your readers suggest anything that would destroy the worm, and so prevent the necessity of taking up the floor, which would be very inconvenient?—Nemo.

[5458.]—**Waterproof Covering.**—I have some cellars covered with flags laid on joists, the flags being open to the weather; I want to make this covering entirely waterproof. Can any one recommend anything with which to fill the joints which may be depended upon, or any substance which can be put on in a thin layer which will wear and be waterproof? Some of the London streets are laid with a kind of asphalte, or similar substance, in layers of from 1in. to 2in. thick—would that answer? If so, what is the substance? Any opinions will oblige—Jink.

[5459.]—**Old Brasses in the Chapels of the Inns of Court.**—Will any one kindly inform me if there are any old brasses in the Temple Church, or in any of the chapels belonging to the Inns?—F. I. O.

[5460.]—**Heel-ball Stains.**—Can any one tell me the best way to take out the stain of heel-ball in a rubbing, where it has gone over the outline?—Q. E. D.

[5461.]—**Stamped Agreements.**—If the agreements are stamped with a sixpenny stamp to each contract, what should the plans and conditions have?—T. S.

[5462.]—**Copying Mouldings.**—Will any practical reader kindly say what is the most reliable and correct method of obtaining the profile of a moulding without the use of the cymagraph? This question has been asked several times in these columns, but, I believe, never satisfactorily answered.—Cyma.

[5463.]—**Light.**—A client of mine, A, gets light to a sitting-room by a window overlooking B's yard, said window being used for certainly 20 years. B, in enlarging his house, has built round the window, which now gets light only from a well-hole 4ft. by 2ft. B's new walls at present are as high as top of window, and apparently will be carried up another story. Has A any redress?—Architect.

[5464.]—**Grey Bricks.**—Is there a composition which will have the effect of making bricks burn grey after being dipped into it, or after it has been applied to them? If so, I shall be glad if some of your readers will kindly favour me with particulars. I want to burn bricks grey on the ends and one side, but the clay I have to make them from will not burn grey in its natural state.—C. M.

[5465.]—**Construction of Roof.**—I have a roof to construct for a public room, the span of which is about 20ft. Will some of your readers kindly favour me with their opinion as to the strongest and cheapest plan to construct it? The roof must be open to the purlins, and I wish to avoid the expense of curved ribs, and the use of tie-beams.—A Young Builder.

REPLIES.

[5380.]—**Paris and the Exhibition.**—I have not the least sympathy with any young unmarried man who says he "should exceedingly like to go abroad, but really can't afford it." The "can't" means "won't." Many working men get married young, and quickly find a little family grow up around them; and those of us who are fathers, and happen to be blessed with a numerous progeny, know only too well how tightly the shoe pinches when one's stipend is not an unlimited one. But with young men it is different, and there is no mason, joiner, painter, or plumber in Great Britain living is "single blessedness" who may not readily, with great advantage to himself, take a week or a fortnight's holiday in Paris this year, if he be so inclined. I speak quite confidently upon this matter. I remember that when I was first constrained to take a trip to the Continent my income was exceptionally limited. I was then an apprentice lad down in Yorkshire, and all the money in the world I had at my command was the modest weekly wage of one shilling. By dint of perseverance, I contrived to save a couple of pounds or so out of this, and then went off, all by myself, for a week's walking tour in the north of France. When I landed at Boulogne I certainly had not more than eighteen shillings at my command, but, by studying economy, these not only eked out seven or eight days very well, but enough was left to purchase and carry home a little present for my mother. Again, I remember, as a young man of two or three and twenty, finding myself in fair Florence with less than five shillings in my pocket, and not a friend I could look to in all Italy for a single helping centessimi. And on that sum—and what I picked up on the road—I walked with my face homeward right through to Paris—five hundred miles as the crow flies, and about twice that distance as the tramp walks. With a heavy kit of tools on my back, but with a light heart within me, I crossed, alone and in mid-winter, Mont Cenis—a feat, it is said, few people have cared to do. And when I recollect how I waded for miles in snow nearly up to my middle, uncertain whether I was going to be benighted on the summit or not, I am not quite sure that I should care, under similar circumstances, to do it again. Now, all this goes to to prove that one need not necessarily spend a deal of money when abroad, and that it is quite within the power of most people to make themselves acquainted with much of the Continent at a moderate cost, if they are desirous of doing so. There is no doubt but that, at the present time, Paris is dear; but if intending visitors will keep away from the English and fashionable quarters, and use ordinary prudence, they need not spend more than they would do in London. I have a pupil at the Exhibition. He is a sharp good little chap, 17 years of age. He pays 7 francs a week (5s. 10d.) for a bedroom near the building, and has all his meals out. He breakfasts, dines, and sups at one of the five thousand and odd restaurants, and other places open for the support of the inner man, that exist in the immediate neighbourhood, at a cost of about 2 francs (1s. 8d.) a day; so that his expenses, all told, are a trifle under a pound a week. It should be borne in mind, too, that until I sent him over last March he had never been out of England, that he did not speak a word of French, and went over quite by himself; so what he has done others may do readily enough. Working men who find themselves in Paris for the first time this summer cannot do better than make straight for the Exhibition. They must be careful, however, if they possess a portmanteau or carpet-bag, not to take either in, for, although the officials at the gates will allow anything to pass in, they will permit nothing to go *out* again until the final closing of the show. Once in the place, let the visitor find his way into the British section, and there strike up an acquaintance with the first good-natured-looking English assistant he may come across. In due course the pair will adjourn to the nearest buffet, and the stranger will find that, whilst drinking a friendly glass of "bitter," his acclimated fellow-countryman will give him more practical advice as to where to sleep, where to eat, what to see, and how to see it, than he would find out for himself in a month. It may be useful to numerous readers who have friends abroad to know that the postage for each number of the Building News is 2d. for all places upon the Continent, the Colonies, or America, where the penny newspaper rate is in force. Thanks to the many excellent plates this publication contains, it uniformly weighs more than 4oz.—the limit for the penny post—so that, if insufficiently prepaid, the journal, instead of going as its sender intends, gets into the Dead Office—a bourne from which no paper returns.—H. Hems.

[5424.]—**Emigration.**—I see that there is one more assistant who wishes to know the prospects of emigration. As regards Australia and Canada, I can tell him, by experience, they are overstocked already. If in sufficient health, "O. Lane" might try Bombay or Calcutta with good prospects. With kindly wishes to the Building News, the best of papers architecturally.—Toronto.

[5450.]—**Copying Apparatus.**—There are two or three recent inventions for making ten or twenty copies or fac-similes of written documents; especially B. ford's fac-simile process, and Zuccato's papyrograph. Specially prepared paper, and ink, and an ordinary screw copying-press are required. Order through a stationer.—Kilburn.

Mr. Aird has been elected borough surveyor of St. Albans out of 29 candidates.

On Tuesday afternoon the memorial stones of a new Baptist chapel, now in course of erection at Walsall, were laid. The building is from the designs of Mr. W. F. Markwick, Walsall, and combines the Classic and Italian styles. It will be 78ft. long, including an orchestra 44ft. wide and 30ft. high, and, exclusive of the orchestra, will provide accommodation for 680 worshippers. Best red pressed bricks are to be used in the front and two side elevations, with dressings of Hollington stone throughout, and will be enriched with moulded and carved caps, arches, and cornices. The building, including site, will cost about £40,000. The builders are Messrs. Rowley, jun., and Lynex, of Walsall.

WATER SUPPLY AND SANITARY MATTERS.

London Water Supply.—On Tuesday a deputation from the Vestry of Bermondsey waited upon Mr. Sclater-Booth on the subject of the inadequate supply of water rendered by the Southwark and Vauxhall Water Company to the inhabitants of Bermondsey, numbering about 100,000 persons. What was supplied was both deficient in quality and quantity. The company had gone to great expense in the construction of a reservoir at Nunhead capable of holding 18 million gallons, but it had never been charged with water. They urged that a constant supply should be given which would insure greater purity. They prayed Mr. Sclater-Booth to compel the company to provide a constant supply. In every instance the company had been apprised of the complaints made, but no remedy was applied. Mr. Sclater-Booth pointed out that their first proceeding, if they wanted a constant supply of water, was to apply to the company, as prescribed by the Act, and in the event of their refusing, he had power to direct an inquiry with the view to make it compulsory on the company to give it. He thought that bad supplies were often due to defective fittings, and in such cases the company was not to blame; that was so in some of the wealthiest West-end institutions, he regretted to say. He would bring their complaint to the company's notice and let them know in writing the reply made. If they desired he would, on receiving the necessary complaints, make a formal inquiry as prescribed by the 9th section of the Act, 1859.

STATUES, MEMORIALS, &c.

Edinburgh.—A bronze statue of Dr. Chalmers was unveiled at Edinburgh on Saturday. The sculptor is Sir John Steell. The statue, which has been executed on the scale of 12ft., is placed on a pedestal of red granite designed by Mr. W. Steell, architect (son of the sculptor), in a plain and massive style, intended to harmonise with the prevailing style of the monument. This structure has been erected by Messrs. Macdonald, Field, and Co., Aberdeen.

LEGAL INTELLIGENCE.

Bricks of Varying Thickness.—Walsall County Court, July 25th.—New Trial of Caddick v. Barton.—On the previous hearing the plaintiffs, Messrs. Caddick and Sons, brickmakers, Bloxwich, obtained a verdict of £5 (including £3 paid into court), against defendant, Mr. Robert Barton, builder, Hednesford, in respect of some best red pressed bricks, which the plaintiffs had supplied to the defendant. Evidence was now adduced to show that the bricks were not of the quality contracted for, inasmuch as they varied in breadth from 3⅜ to 3⅝in., instead of being of a uniform size within one-eighth of an inch. After a great deal of evidence had been given, his Honour (Mr. Griffiths) reversed the previous decision and found for the defendant, holding that owing to the irregularities already named, the bricks were not what they professed to be—viz., best bricks of the description specified. In the course of the case it was stated that in selecting the bricks at the plaintiff's yard, a large quantity were rejected and set aside on account of these irregularities, and his Honour suggested that some of these were sent out by mistake.

Memorial stones of a Methodist New Connection chapel and schools, Upper Gornal, were laid on Monday week. The building will consist of a chapel, 60ft. by 40ft., with school underneath, 44ft. 3in. by 40ft., and 14ft. high, and two class-rooms. The chapel will accommodate 350, and the school room 220, without the class-rooms. The contract is £1,420.

The committee for the erection of a monument to Spinoza at the Hague has awarded the first prize to the sculptor Hexamer, of Paris, and the second prize to the sculptor Tushaus, of Dusseldorf.

We understand that two or three places yet remain to be filled up to make the required number for the Architectural Association excursion to Yorkshire, which commences on the 12th inst. Intending excursionists should apply to the secretary without delay. We are assured that the visit will be unusually interesting.

New tramways belonging to a private company have been commenced in Lancaster-road, Preston under a local Act which received the Royal assent in May last. Mr. Garlick is superintending the construction for the Corporation.

The corner-stone of the new church of St. Matthias, Sheffield, was laid on Tuesday. The edifice will accommodate seven hundred and twenty worshippers. It is to be of the Early English style, and the interior arrangements comprise a nave, north and south aisles, a chancel, a chamber for the organ, the choir, and clergy, and vestries. There is to be neither tower nor spire, but simply a bell turret. Mr. J. D. Webster is the architect; and the cost is to be under £5,000.

Our Office Table.

The proposal of the restoration committee to place a high-pitched roof on the nave of St. Alban's Cathedral, extending from the western porch to the tower, and a corresponding gable at the west front, has evoked a remonstrance from Lord Carnarvon, as the President of the Society of Antiquaries, which deserves serious consideration. It is quite true, as Lord Carnarvon points out, that a high-pitched roof at St. Alban's would not be a novelty, and to a superficial mind the restoration of a feature which was removed in the fifteenth century might seem desirable. But when it is remembered what magnificence the accidental substitution of flat roofs throughout has given to the appearance of the tower, very few who really appreciate the exterior of St. Alban's would hazard the proposed alteration. It is hardly probable that any gain can accrue to the interior of the cathedral unless, indeed, the restoration committee propose to alter the present flat ceiling, which is scarcely likely. The matter, doubtless, is not yet finally decided; we feel sure that reconsideration is desirable, and that it would be well to submit the matter to the Institute Council, as the chief representative body of the profession, for advice thereupon.

Dr. Heintzel, in *Dingler's Journal*, thinks that the influence of light upon cement has not hitherto been sufficiently considered. He instituted some experiments upon a quantity of cement, which he divided into three parcels, exposing parcel A to the air and full light, B to the air and diffused light, and secluding C in darkness from the air. After six months he found that A made a weak mortar, by absorbing 38 per cent. of its weight in water, and it had become crumbly; B, with 33½ per cent. of water, made a mortar which was too adhesive to the trowel, and it yielded up none of its water; C, with 33½ per cent. of water, made an excellent mortar, easily stirred and flowing, and it relinquished some of its water. After setting for 28 days the relative strength was: A, 3; B, 37·9; C, 44·6.

The conclusion of the Anglo-Turkish Convention, giving the British Government protective rights over Asiatic Turkey, had greatly aroused the hopes of archæologists, who trusted that now full powers would be given to the British Museum authorities to carry out systematic and continued excavations on the sites of Nineveh, Babylon, and other cities of the ancient world. The Treasury, however, take a different view, and have withdrawn any further grant to the British Museum for these purposes. Private enterprise is already stirring itself in the formation of an organisation whose agents shall have equal claims on the antiquary and the merchant, and it is said that an expedition will leave this country next spring for Cyprus, which, besides fulfilling the functions of an archæological expedition proper, will also report as to the best mode of developing the resources of the island.

Although, as intimated in our article last week, the ancient Cypriots do not appear to have excelled in art, the names of some artists are preserved, and Mr. J. J. Lake, whose knowledge of the island is embodied in a pamphlet just published, thinks it probable that further researches will discover others. One sculptor named Styppax is known as a contemporary of Pericles. Another, a native of Salamis, was Simos; and another native artist of Salamis was Onasiphon, as proved by an inscription at Rhodes, where also occurs the name of Epicharmos, of Soli. One Zenodotos is mentioned in a tablet at New Paphos. Embroidery appears to have been carried almost to the position of a fine art. It is called Assyrian work by Pausanias.

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Effect a Great Saving in Charging and Discharging, and 50 per cent. of Fuel.

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CHIPS.

At a meeting held at Longton, North Staffordshire, on the 19th July, it was decided to restore the parish church, and to ask Mr. Charles Lynam to undertake the work.

The North Eastern Railway Company is erecting an extension bridge over the Queen-street crossing in York city. Mr. Copperthwaite, engineer for the southern division, has had the superintendence of the bridge, which is a substantial structure of seven arches, and the contractor is Mr. Cameron, of Leeds. The work is nearly completed.

On Tuesday week, the new schools erected in Market-street, Fenton, by the Stoke-on-Trent School Board, were opened. The building has a frontage to the street of about 90 feet, and is of two stories. The boys' school consists of a main room 70ft. long and 22ft. wide, with two large class-rooms, the accommodation being for 320 scholars. The girls' school has a main room and two class-rooms for 240 children. The school for infants consists of a main room to accommodate 120, and two class-rooms 95 children each. The cost, inclusive of the site, was 6,440, giving an expenditure of £6 10s. a-head.

The North Staffordshire Sanitary Officers' Association met on Thursday week at Rudyard, when Mr. Robert Farrow, sanitary inspector of Leek, in an opening address reviewed the various sanitary questions connected with the office of inspector. A discussion followed in which the sewer ventilation, the water carriage system, and irrigation, advocated by the chairman, were generally approved of.

On Tuesday Mr. G. E. Street, R.A., was in Aberdeen conferring with the committee having charge of the renovation and decoration of Old Machar Cathedral. Mr. Street went over the cathedral along with the committee, and intimated that he would give a report on the whole subject within a few days.

Another unsuccessful attempt was made on Tuesday to sell Sadler's Wells Theatre.

NOTICE OF REMOVAL.

CHUBB AND SON,

LOCK, SAFE, AND IRON DOOR MAKERS,

Have REMOVED their SAFE and LOCK BUSINESS to new and extensive Premises,

128, QUEEN VICTORIA STREET, ST. PAUL'S, E.C.

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Makers to the QUEEN, H.R.H. the PRINCE OF WALES, and the Bank of England.

VERITY BROTHERS.

Patent Ventilator or Air-Propeller, for the introduction of Cold or Warm Air into Dwellings, &c.

The Machine may be seen in action at their Showrooms, 127, Regent-street, London, W.

The apparatus consists of a drum with a double set of fans, which are worked by a fly-wheel placed in the centre, and on the same axle as fans. The motive for this fly-wheel is arrived at by a small jet of water being directed on to it, causing both the wheel and fans to revolve with great velocity, the air passing through the machine at a rate equal to 2,500 feet per minute, if desired, according to size of apparatus.

N.B.—The above Machine may be used either as an exhauster or injector, as may be preferred, or both objects combined.

Also Patentees of the Fireclay Burners for Gas Fires and Cooking Purposes, and Patentees of the Tubular Gas Boiler for Baths and Conservatories, &c.

Designers and Manufacturers of Lamps and Candelabra.

Office and Works, 155, Queen's-road, Bayswater, W. [Advt.]

HIGH-CLASS VARNISHES.

READE BROTHERS, Tower Varnish Works, Wolverhampton, respectfully invite attention to their Varnishes for House Painters, Decorators, and Builders, which will be found of uniform excellence, and for elasticity, lustre, and durability all that can be desired. They would direct special attention to their Extra Hard Drying Varnishes for church seats, and seats of schools and public buildings, which for hard-drying, brilliancy, and wear are unsurpassed.

To Destroy Blackbeetles, Fleas, Bugs, and all Insects, use VESPER'S WONDERFUL INSECT DESTROYING POWDER, which is sold in Tin Boxes 6d. and 1s. each, or post free for 8 or 14 stamps from the sole proprietors, G. and T. VESPER, 428, Commercial-road, London, E. The name of VESPER is stamped on top of every box; otherwise none are genuine.—[Advt.]

Lamplough's Pyretic Saline is refreshing, most agreeable, and the preventive of FEVERS, BILIOUSNESS, SMALL POX, SKIN DISEASES, and many other spring and summer ailments. Sold by chemists throughout the world, and the Maker 113, Holborn Hill. *Use no substitute.*—[Advt.]

Helliwell's Patent System

Of AIR and WATER-TIGHT GLAZING, WITHOUT PUTTY, and without exposing any outside woodwork to paint, and NEW SYSTEM of COVERING ROOFS.

The fasteners are brass or copper. The peculiar arrangement of the glass covers the whole of the woodwork, and only the small fastener is visible; therefore the roof is indestructible, and outside painting unnecessary. The squares of glass can be easily removed, and the whole taken out and cleaned by any inexperienced person. Breakage is impossible except through carelessness or accident.

The glazing is more air-tight than the old putty system, yet any amount of ventilation can be given.

Old roofs may be re-glazed on this principle, and roofs are covered with slates or zinc on this system.

Extract from Building News: "Mr. T.W. Helliwell, of Brighouse, has recently patented and introduced a new system of glazing and covering roofs, which is certainly superior to anything of the kind we have seen before . . . . and it will, in our opinion, supersede any other system before the public."

Important references and all particulars from the patentee, T. W. HELLIWELL, Brighouse, Yorkshire; and 19, Parliament-street, London.—[Advt.]

Trade News.

WAGES MOVEMENT.

Bristol.—A strike of plasterers commenced on Monday in Bristol. Several months ago they demanded a rise of a halfpenny an hour. Some of the employers have conceded the advance, but most of the masters refuse to give it, and declare that if the men strike they shall not come in again except at a reduction of a halfpenny an hour.

Carnarvonshire.—On Wednesday notices were posted at two of the principal slate quarries at Nantlle, in Carnarvonshire, notifying that owing to the continued dulness of the slate trade the workings would be at once stopped. This will cause some thousands of men to be thrown out of employment, and it is probable that many other quarries will soon adopt a similar course, the slate trade being worse now than has been known for many years.

Edinburgh.—The Edinburgh plasterers are still on strike, and last week increased the allowance by 2s.

WHITLAND ABBEY GREEN SLATES.

These SLATES are of a grey-green tint, are stout, and made in all sizes. A large stock available for immediate delivery. For further particulars (with a list of important buildings covered) apply to the MANAGER, Cynderwen, R.S.O., Carmarthenshire.—[Advt.]

Holloway's Pills have many competitors, though no equals, for supplying the young and delicate with a simple strengthening and purifying aperient. These Pills, composed of the purest balsams, are particularly adapted for all complaints peculiar to females, and are most serviceable at the critical periods of early and mature years.

TENDERS.

Bethnal Green.—For the formation of sewer carriage, and footways in connection therewith, in the line of the Bethnal Green improvement, new street between Hightstreet, Shoreditch, and Gibraltar-gardens, for the Metropolitan Board of Works. Sir J. W. Bazalgette, engineer to the Board:—

Ford and Norris	£25,600 0 0
Cook and Co.	21,763 6 0
Stephens and Co.	21,300 0 0
Webster	19,970 0 0
Crogerin	19,900 0 0
Mowlem and Co.	19,500 0 0
Nowell and Robson (accepted) ...	19,460 0 0
Carless	18,839 0 6

Borley.—For erection of a mixed school and mistress's house at Borley, Essex, for the Borley and Lyston School Board. Mr. Samuel Knight, 24, Cornhill, E.C., architect to the Board:—

Grimwood and Sons (accepted)	£795

Burslem.—For additions to Albert-street works, Burslem. Mr. A. R. Wood, architect; quantities supplied:—

Estimates for carpentry and labour only:

Rogers	£252 13 0
Cooke	185 10 0
Yorke	174 10 0
Bowden (accepted)	167 0 0

Lancastre.—For new Centenary Church, Lancaster. Messrs. Hetherington and Oliver, architects, Carlisle; quantities by Mr. G. Connell:—

Briggs and Lancaster (mason, &c.)...	£2,310 0 0
Wright, R. S. (joiner)...	1,196 6 0
Hartley, Henry (slater & plasterer)	215 13 0
Calvert & Heald (plumber & glazier)	257 4 0
Meadowcroft, E. (painter)	120 11 0
The trustees of the late Edmund Sharpe (smith and ironfounder)...	140 0 0
	£4,236 14 0

CAMBERWELL.—For the erection of pantechnicon and two houses in the Station-road, for W. Harris, Esq. Mr. John Farrer, architect and surveyor, Albion-chambers, Moorgate, E.C.:—

Ennor, T., Julian, and Co.	£4,400
Nottle, W. and E.	4,400
Taylor, J.	4,393
Thompson, J.	4,334
Conder, R.	4,297
Holliday, J., jun.	4,265

CITY.—For erection of new premises, No. 112, Fleet-street, E.C., for Messrs. Brentini. Mr. Samuel Knight, architect, 24, Cornhill, City; quantities by Mr. G. Fleetwood, 15, Furnival's-inn, E.C.:—

Colls and Son	£3,470
Patman and Fotheringham	3,190
Nightingale, B. E.	3,177
Shepherd	3,175
Downs and Co.	3,110
Roberts, R. and Co. (accepted)	2,979

CODFORD ST. MARY, WILTSHIRE.—For additions and repairs to parish church:—

Hopkins and Sons	£1,123 10 0
Giles	1,109 0 0
Coleman Bros.	1,077 0 0
Stephens and Bastow	1,075 0 0
Burgess	1,013 11 0
Gaisford	989 12 0
Harris	988 0 0
Balcombe (accepted)	978 13 0

DERBY.—For restorations, Osmaston Church. Mr. Fredk. A. Dovey, architect:—

Wood, J.	£623 15 0
Wood, E.	566 0 0
Lilley and Son	551 0 0
Bullock and Barton	385 0 0

DERBYSHIRE.—For the erection fo a house and other buildings at Padley Hall sewage farm for the Ripley Local Board:—

Oldershaw, W., Heanor	£680
Warren, J., Codnor	470
Fletcher, J., Ripley	450
Welton, W., Ripley	440
Clover, W., Ripley	412
Jackson, G., Ripley	400
Wyld, J., Ripley (accepted)	383

LEA BRIDGE.—For the erection of engine, meter, and boiler houses, smiths' shop, chimney shaft, &c., for the Directors of the Lea Bridge District Gas Company. Mr. Edward H. Thorman, engineer:—

Bangs	£1,987
Wood, F. F. and J.	1,983
Reed	1,928
Falkner	1,837
Crabb (accepted)	1,750

LONDON.—For painting and other repairs at the Homerton Small Pox Hospital, for the Managers of the Metropolitan Asylum Board. Messrs. A. and C. Harston, architects, 15, Leadenhall-street; no quantities:—

Vigor, F. G. and R., Poplar	£1,257
Bishop, Hoxton	1,250
Wythe, Dalston (accepted)	870
Cook and Co.	663

[Architects' estimate, £1,000.]

LONDON.—For cleaning and painting works at Christ's Hospital, Newgate-street, E.C. Mr. H. S. Legg, architect:

Harrison and Wood	£973
Patman and Fotheringham	823
Pitman and Cuthbertson	720
Morby and Co.	687
Hayward and Son (accepted)	670

LONDON.—For providing additional pumps at Crossness and the Effra and Falcon brook outlets, for the Metropolitan Board of Works. Sir J. W. Bazalgette, engineer to the Board:—

	Crossness.	Effra.	Falcon.	Total.
Webster, Wm.	£6,237	£1,189	£1,678	£9,104
Easton & Anderson (acc. in toto)	6,000	900	800	7,700

NEWCASTLE-UNDER-LYME.—For the works in alterations to shop premises, Hassall-street, for Mr. William Dale. Mr. Ambrose Wood, architect, Regent House, Hanley; quantities supplied:—

Wallworth, J., Congleton	£178 15 0
Sutton, W., Newcastle	171 0 0
Beardmore, G., Newcastle	150 0 0
Grosvenor, J., Tunstall	145 12 0
Cornes, C., Hanley	145 0 0
Bennett, J., Newcastle (accepted)	141 10 0

NORTH WOOLWICH.—Contract No. 1. For the erection of proposed new soap factory at North Woolwich, for Messrs. John Knight and Sons, consisting of stabling for 40 horses, foremen's cottages, fat and packing houses, chimney shaft, roads, paving and concrete foundations. Messrs. Tunley and Boyle, 14, Clement's-lane, Lombard-street, E.C., surveyors; quantities supplied:—

Cooke, B., and Co.	£22,037 13 8
Sabey and Son	20,584 0 0
Cullum, William	19,995 0 0
Merritt and Ashby	19,333 0 0
Baker, George, and Son	19,331 0 0
Sawyer, J. W.	18,500 0 0
Hook and Oldrey	18,350 0 0
Crockett, William	18,317 0 0
Aitchison and Walker	18,256 0 0
Bress, William	18,244 0 0
Kirk and Randall	17,690 6 0
Dickinson, Charles	17,563 0 0
Cowland Bros.	17,486 0 0
Martin, J. W.	17,480 0 0
French, W. E.	17,450 0 0
Sheffield and Prebble	16,873 0 0
Prout, William	16,546 0 0
Perry and Co.	16,400 0 0
Vernon and Ewens	16,272 0 0
Brealy, Robert (withdraw)	16,200 0 0

PORTSEA.—For new warehouse for Messrs. Wendover and Co., Hanover-street, Portsea. Mr. E. Wendover, architect:—

Burbidge (accepted)	£2,000

ROEHAMPTON.—For erection of three model cottages at Roehampton, Surrey, for E. A. Hambro, Esq., built of cement concrete, faced with red Broomhall tiles. Mr. Samuel Knight, architect, 24, Cornhill, City:—

Sutton, Putney (accepted)	£1,000

SWALLOWFIELD.—For a house and offices at Farley Hill, Swallowfield, Berks, for William Simonds, Esq. Mr. W. Ravenscroft, architect, Reading; quantities by Messrs. Cooper and Son, Maidenhead:—

	Additional cost of using brown Portland instead of Bath stone in dressings.	Deduction for using part deal instead of oak in joinery.
Wheeler Bros.	£8,724	—
Higgs	8,686	£405
Rider & Son*	8,578	580
Woodroffe	8,558	480
Filewood	8,390	395
		£198 10 0
		1,000 0 0
		576 3 0
		727 0 0

[* Accepted, using part deal instead of oak in joinery, &c., with Bath stone dressings.]

STRATFORD-ON-AVON.—For the erection of a Congregational chapel, seating 400 persons, and lecture-hall, in Rother Market, Stratford-on-Avon. Mr. H. J. Paull, F.R.I.B.A., of London and Manchester, architect:—

	Chapel.	Lecture-hall.
Gascoyne, Leamington	£3,173	£217
Smallwood, Wootton Waven	3,150	200
Roberts & Son, Stratford-on-Avon (accepted)	2,970	274

WALLINGTON.—For erecting two villas on the Woodcote Estate, Wallington, Surrey, for the Messrs. Parker and the freeholders. Mr. E. P. Loftus Brock, architect:—

Ennor, Julian, and Co.	£3,650
Brass	3,500
Potterton	3,399
Lose	3,320
Jarrett	3,050
Mattock Bros.	2,993
Bish	2,800
Howe and White	2,350

THORPE, ESSEX.—Maltings for Messrs. Free and Hollis. Mr. G. Gard Pye, architect, Colchester:—

	Inclusive of iron roof.
Everitt and Son	£3,925
Saunders and Son	3,638
Brown, James	3,600
Dobson, George (accepted)	3,248

TUNSTALL.—For Co-operative stores, Tunstall. Mr. A. R. Wood, architect; quantities supplied:—

Cartlidge	£1,450 0 0
Proctor	1,330 0 0
Halfpenny	1,300 0 0
Smith	1,273 17 0
Cooke	1,260 0 0
Cope and Goodwin	1,105 0 0
Yorke	1,098 0 0

TUNSTALL.—For house and stabling at Tunstall. Mr. A. R. Wood, architect; quantities supplied:—

Estimates not including brickwork:

Hancock	£335
Yorke	309
Walker and Bainbridge (accepted)	282

TUNSTALL.—For Congregational church, Tunstall. Mr. A. R. Wood, architect; quantities supplied:—

Hancock	£1,260
Yorke (accepted)	1,240
Proctor	1,200

WHITBY.—For the erection of schools to accommodate 267 children, for the Whitby School Board, as computed by the Educational Department. Messrs. Armfield and Bottomley, architects, 1, Zetland-road, Middlesbro'-on-Tees, and at Whitby:—

Lord, Joseph, Middlesbro'	£1,935 18 6
Langdale, Wm., and Sons, Whitby	1,497 0 0
Baston, Wm., Whitby	1,289 10 0
Gladstone, James, Whitby*	1,165 0 0

[* Accepted, with the addition of £105 for a dado of glazed bricks in schools and class-rooms. Cost per child of school buildings, playgrounds, and boundary walls, £4 15s. 1½d.]

WOLSTANTON.—For villa at Wolstanton. Mr. A. R. Wood, architect, Tunstall; quantities supplied:—

Proctor	£1,850
Cooke	1,790
Yorke (accepted)	1,750

WOLSTANTON.—For Primitive Methodist chapel, Wolstanton. Mr. A. R. Wood, architect; quantities supplied:—

Cooke	£2,024
Bennett	1,960
Yorke	1,948
Proctor (accepted)	1,850

ERRATUM.—In our list of tenders last week for three blocks of semi-detached cottages at "Wells," Somerset, for Messrs. James Fussell, Sons, and Co., the name of the town should have been "Mells," not "Wells."

BATH STONE OF BEST QUALITY.

WESTWOOD GROUND, BOX GROUND, CORSHAM DOWN, and COMBE DOWN.

RANDELL, SAUNDERS, & CO. LIMITED.

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BATH STONE OFFICE, CORSHAM, WILTS. [ADVT.]

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P. E. CHAPPUIS, Patentee. Factory, 69, Fleet-street, London, E.C.

N.B.—DIAGRAMS AND PROSPECTUSES ON APPLICATION.

THE BUILDING NEWS.

LONDON, FRIDAY, AUGUST 9, 1878.

THE ARCHÆOLOGICAL INSTITUTE AND RESTORATION.

IN Lord Alwyne Compton's well-timed and sensible address, delivered last week before the Royal Archæological Institute, at Northampton, and fully reported in our last number, the question of Restoration was reasonably dealt with. We turn from the shrieking solicitude of the anti-restorers to the remarks of Lord Alwyne Compton with considerable relief. Lord Alwyne Compton did not assert that all restoration had been conducted with discreet moderation, but he contended that it was thoroughly honest for the time—an allegation distinctly disputed by the anti-restorationists—and, lastly, that it was preferable to a bigoted destruction. He might have put the matter even more strongly. He might have asked what would have been the condition of our cathedrals and old churches at the present time if the "do-nothing" policy had prevailed throughout the present century. We have always considered that the large amount of restoration effected has exercised no small influence for good. The activity created by the movement has given birth to a school of artists and art workmen of which England may well feel proud, in spite of the sneers of those who have learned from them the little they know of art; and this spread of art education did much to dispel the apathetic desolation which previously existed. Lord Alwyne Compton rightly enough instanced the difficulties which had arisen in the face of legislation to provide for the simple loss from cultivation of the few acres of ground covered by ancient monuments, and pointed out that no response could be looked for to the suggested appeal to build new churches (side by side with the old), except from the small band of anti-restorers; and, even were it otherwise, the older buildings so "preserved would soon fall into hopeless decay." The two cases of restoration instanced by the speaker well illustrated his argument. Lord Alwyne Compton referred, first, to the circular church of St. Sepulchre, Northampton—one of a few English examples — and mentioned the recent restoration of the building by Sir Gilbert Scott as a case in point. In this instance no doubtful features were reproduced, while many concealed beauties have been brought to light. What, we may ask, would the anti-restoration society have done? They would have let it remain in the hopeless condition in which it was found—the half-discernible features of Simon de Liz's church would have been left to further decay under the specious pretext of preservation, while the hidden details of the 12th century would still have remained concealed by the hideous additions of later times. The other example—that of the Queen's Cross—supplies a still more cogent protest against the proposition that preservation is not restoration, and Lord Compton's narration of facts completes the *reductio ad absurdum*. It was proved beyond the shadow of a doubt that the Queen's Cross exists in consequence of three successful restorations in 1713, in 1762, and last in 1836. Mr. Law's recital of these restorations, read the other day, indeed confirms the admitted fact that we owe to these successful reparations the very existence of the cross. Even Blore, that *enfant terrible* of Gothicists, did not venture to reproduce the crowning figure, which was, consequently, left imperfect by him. The case cited by Mr. J. H. Parker—namely, the restoration of Bradford-on-Avon Church—was another strong instance. We concur in the suggestion made by Lord Compton, that judicious and careful restorations can only be made with the assistance of societies like the Archæological Institute; and that, to further this object, an amalgamation of the Archæological Institute and county associations, combined with the united action of the Royal Institute of British Architects and the Society of Antiquaries, is most advisable, if not positively essential. We decidedly think, and the opinion has been expressed more than once in these pages, that all restorations should, where possible, be confided to the joint care of archæologists and architects. If those who have devoted their studies to the acquisition of the history and peculiarities of different periods and styles of architecture cannot be entrusted with the reparation of our ancient buildings, we may be pardoned for hesitating to commit them into the hands of a few individuals who have, with more presumption than discretion, set themselves up as the public censors of restoration, and as the professed champions of everything ancient. We hope the archæological societies which meet at this season will take up the suggestion thrown out by Lord Compton—organise a committee with the object of securing united action with our leading architectural societies, and so attain, in the only effectual manner, the intelligent and careful restoration of our ancient edifices, and thus relieve the Society for the Preservation of Ancient Buildings of an anxiety which is wearing away the souls of its supporters.

Lord Alwyne Compton's speech may well be considered together with another proposal referred to last week—namely, that of the Restoration Committee of St. Alban's Cathedral, to place a high-pitched roof on the nave of the abbey, and a corresponding gable at the west front. Lord Carnarvon, the President of the Society of Antiquaries, has protested against the scheme, pointing out that, though the substitution of a high-pitched roof, such as that originally intended from the remains of the weatherings in the tower, may seem desirable, it is certainly not called for; and that, if carried out, it would involve the sacrifice of the accidental charm attached to the later 15th-century flat roof which now covers the nave of the abbey, and the Archæological Institute at its annual meeting passed a resolution of similar tenor to that of the Society of Antiquaries. Earl Cowper, on the ground of unnecessary restoration, agrees with Lord Carnarvon, while Mr. Beresford Hope, in a sensible letter to the *Times*, wisely steers clear of what he calls "destructive restoration" and "unintelligent preservation," and maintains that, "where there is absolute material evidence of the existence of any former feature of a building — evidence sufficient to make its restoration mathematically certain — and where the reason for the original existence of that feature is equally certain, and is such as abstractly to approve itself to our reason, then its restoration must be safe." Applying these tests to St. Alban's, the original angle and weatherings of the roof remain, and may be seen on the tower, against which the nave roof abutted, or was intended to abut. As regards the second test, Mr. Hope observes, with candour, it is inferential. He rightly remarks, the mediæval architect intended the steep roof for a practical use, and not for an artistic purpose, though we have no evidence, on the other hand, why the architects of the 15th century saw fit to substitute a flat roof and ceiling. Archæologically, again, there is something to urge for the retention of a substitution, if on no other adducible ground. The flat roof has, we must confess, an accidental charm. It is certainly picturesque, and its long association with St. Alban's Abbey make us, as we hinted last week, hesitate to hazard the change. But there is another point—the flat painted ceiling, which cannot judiciously be interfered with—that, to our minds, should, so far, dispose of the reasons given by Mr. Hope, who, himself, thinks it is entirely independent, and should be retained as a relic of old art, which it would be sacrilegious to disturb. To retain the flat painted ceiling, and to heighten the external roof, would be inconsistent and indefensible on architectural grounds. We do not know the reasons which induced the old builders to adopt the flat ceiling. It was probably because it improved the acoustics, or appeared more in character with the Early style; but, for whichever reason, or even if economy was the motive, there it is, and to tamper with it would be, to say the least, hazardous for several reasons. We look upon this particular matter as having an important bearing upon the question of restoration, and as showing the value of architectural aid in arriving at a decision. We counsel, therefore, the restoration committee to pause, to reconsider their proposal, and, as we urged last week, to submit the question to the Institute Council for advice. There may be much to say on the part of the advocates of the high pitched roof—that there is more than we had thought is evident enough from Sir Edmund Beckett's letter in yesterday's *Times*, and from Prof. Donaldson's more scholarly if less vigorous communication which appeared with it. No harm, however, but every good, can result from a dispassionate reconsideration of the matter, aided by the best professional knowledge it is possible to command. The suggestion carries with it the wider one we have above mentioned—the absolute necessity for united action on the part of the Archæological and Architectural Societies in this most important matter of restoration. There is no architect worth the name who would not eagerly avail himself of the assistance and counsel of such a combination as Lord Alwyne Compton suggested, or who would not gratefully contrast it with the hysterical objurgations of those gentlemen who propose to transfer our ancient buildings to the custody of the engineers.

BUILDING IN BRIGHTON.

THE visitor to Brighton will mark many additions to the architecture of that favourite watering-place which have been made within the last two or three years. Beyond the western boundary of the borough, indeed, the new neighbourhood of Cliftonville is rapidly extending its rows of "neat villas" to the westward, but several improvements in the town itself claim notice as well. Besides the new churches of St. Bartholomew, Ann-street, St. Martin, in the Lewes-road, and St. James's Chapel, already noticed by us, Mr. Emerson is engaged in the erection of a new church in St. James'-street, the interior of which we shall probably illustrate, and a few of the streets display architectural improvements. Near the railway station, a large hotel is in progress by Mr. J. Hall, builder, in a kind of local Classic—its interest chiefly consisting in its stuccoed fronts, and its peculiarly small pavilion roofs that are intended probably for ornaments, though they are really disfigurements. The corner is treated in a very flat and insipid manner, the mouldings and enrichments are especially commonplace, and the scrolls over the angle window look more fit for a pasteboard model than for anything bearing the purpose of window dressings. From the proportions of the windows and details, the most friendly interpretation we can put upon it is, that the architect's design

has been mercilessly emasculated, and we cannot help thinking a valuable opportunity has been lost.

In North-street, two blocks of white brick shops and dwellings are being erected by Mr. Chappell, of Pimlico and Brighton, displaying a free use of moulded brickwork in the jambs and arches—stone being introduced in dressings, and in circular corbelled balconettes over some of the windows. The style is scarcely an improvement on the Brightonian Vernacular; the corbelled stops to cornice and the arches above the upper tier of windows are not pleasing features, and a certain clumsiness of detail is apparent. Stamped diapered brick is used for horizontal bands between the windows—a feature that may have some merit in a clear atmosphere such as Brighton possesses, but which is by no means to be commended in London, or in large smoky towns. A corner building in stucco is being completed in the same street of more sober character; and, we may incidentally remark here, that stucco and white brick seem to be the prevailing materials employed in the new buildings of London-upon-Sea. The Queen Anne style has certainly made its appearance; we see it in one or two of the Board Schools, but it has been introduced with considerable reserve. Thus, in the buildings in North-street, we find plaster-coved cornices, relieved by incised patterns; the effect is not unpleasing, if rather far-fetched. In the King's-road, at the corner of Ship-street, we observe a pleasingly-treated front, faced with cement in a Classical style, in which the bay window, forming one vertical bay of the front, has been effectively managed. The angle pilasters, the enriched pilaster caps, and details, are designed upon correct principles, and the ornamentation is devoid of the *tertium quid* or chimerical character met with in other instances. An attempt has been made at the corner of West-street to combine coloured decoration with stucco, but the success of the combination has been injured by the tawdry design. We refer to Messrs. Feltoe and Son's new corner front, in which red and black brick are introduced as dressings in a stuccoed front. The shop-front and mezzanine above is enclosed within a steep-pointed arch, in which the voussoirs are of red and black brick. The other windows are similarly treated, but the most objectionable feature is a zinc roof with corner pinnacles perched upon the top of the front, with the avowed object of giving height to the façade. A little examination shows this roof to be but a counterfeit expedient—a kind of sham—and the elevation strongly suggests the devices of the scene-painter. The Chapel Royal, in North-street, which has lately undergone remodelling from the designs of Mr. A. Blomfield, of London, is now completed. By those who knew it before the alteration, the transformation will be deemed a decided improvement. The end gallery has been taken away, and the walls decorated in low-toned colours as a reredos to the altar, the flat ceiling has been removed, and a square-shaped domed lantern is carried up, the plastered surfaces being ornamented by panels and devices in a brown colour. Surrounding the interior, and forming the aisles and supports to the side galleries, is a light arcade of woodwork, stained in a brown tint; the caps to the pillars are gilt and picked out in blue, and the spandrels are framed in a light and pleasing manner. The colouring of the glass is very effective, and the interior is an instance of what can be done to render a forbidding and cold-looking structure architectural if not ecclesiastical. Mr. Emerson's new church in St. James'-street is worth a passing note on account of certain peculiarities both of plan and design. It consists of a wide nave and two aisles of three bays, short transept, and organ recess, with an apsidal chancel. The aisles are not lean-to, but cross gabled, each bay being roofed as a cross vault, its inner end abutting against the nave. The arcades have lofty pillars in clusters of engaged shafts of stone, the capitals are carved bells of a rich Early French or semi-Romanesque character. The apse, groined in red brick with radiating stone ribs, has been managed also very effectively; detached angle pillars carry each compartment of the vault, and their caps have been very artistically executed. The transepts and choir are also vaulted in brick and stone, and the nave is covered with a wooden waggon-headed roof. At the south or entrance end, towards the street, the architect has contrived to give a piquant effect by an apsidal end, or kind of narthex, which opens from an arch of wide span to the nave. This arch carries the gabled end, and the roof, we presume, will be hipped from the angles of the polygon. A square tower attached to the south-west angle groups well with this feature, and has a wide-arched doorway, well recessed, under which are two entrances. The filling-in, and the jambs and arches, are in a red sandstone (Mansfield). We must not forget to mention that the walls are faced on both sides with red brick, and are filled in with cement concrete. The vaults of aisles have also concrete cores, and, we are told, no settlement or fracture of any kind has occurred. We shall probably refer to this structure again.

We, must look, however, in the direction of Hove to estimate the real progress that has been made of late. Recently we had occasion to refer to building in the west end of Brighton, and we then remarked on the exceeding want of variety and architectural effort displayed in the new neighbourhood known as the West Brighton Estate. We must mention, as exceptional, a few blocks of houses, facing the sea, in progress of erection on the extreme west of the Stanford Estate, known as King's-gardens, and situated between the 4th and 5th avenues. Mr. Chappell, of Pimlico and Brighton, is the builder of these, and Mr. Thomas, of London, we believe, is the architect. We had the curiosity to inspect one of the corner houses of a block of seven. Entering a spacious hall, we find a morning-room, about 20ft. by 17ft., in front towards the sea, and a dining-room, about 26ft. by 16ft., behind; in the rear we find a gentleman's room, butler's pantry, &c. On the first floor the drawing-room extends over the morning-room and hall in front, and over a considerable portion of the dining-room; it thus takes an irregular shape These rooms have Portland-cement skirtings, pitch-pine floors, laid on ⅜in. yellow deal, pedimented door dressings, and the drawing-room is divided by pilasters and entablatures of Parian cement. Enriched coved cornices and handsome marble chimney-pieces adorn the rooms, which are left to the decorative taste of purchasers. Bath-rooms, water-closets, and twelve bedrooms in all are provided. There are five floors, or stories, in front, and four behind; and, from the upper rooms in the Mansard roof, the sea-view is very extensive. A conservatory opens from the back rooms of some of the houses, and every convenience appears to have been studied. In the external treatment white Suffolk brick, relieved by stone, has been employed, and the fronts of the houses have bays of three stories, the casements of the windows to the principal floor opening upon covered balconies, which form a feature in the elevation towards the sea. These balconies, of light wooden uprights, are supported on stone cantilevers, which are relieved by carving on their faces; the window-jambs are of moulded brick, and relief is obtained in bands and friezes of carved stone. The curb roofs, dormers, and details are designed with care and taste, and there is nothing affected or pompous in the style. Other blocks of a similar kind are, we believe, proposed to be built along the cliff. The mansions are freehold, and are, we understand, all for sale. It is hard to say why large houses in flats have not been built upon this estate; no more eligible opportunity could be afforded to investors than rows or blocks of residences in flats facing the sea, in which families of varying means could be accommodated with all the conveniences of a self-contained house or set of apartments, and we hope Mr. Chappell, who has done so much for this suburb, will not overlook the special qualifications of Brighton for this class of residence. In an architectural aspect much more might be done than has been realised; Mr. Galsworthy Davie has indicated how the exterior of suburban villas may be rendered pleasing by the introduction of a feature of use and beauty in a recently-built house noticed before in the Building News; there is certainly an opportunity here for the architect to exhibit his ingenuity in the adaptation of the balcony or the bay window to a sea-side residence. There is no reason why the residences of Piccadilly or Pimlico should be reproduced *ad nauseam* at Brighton, for, though the former may have something in common with the Marine-parade, we have all the difference of climate and locality, and a sea prospect instead of a park.

The Brighton Spring Exhibition of drawings and pictures at the Pavilion, by the way, maintains its interest. This year there are some clever water-colour sketches, contributed by the local "Sketching Club." We note Nos. 178, 190, 191, 175, 181, and 182, as exhibiting a more than usual perception of aërial effect, though a few must be pronounced travesties of Turner's later sketches, if not daubs. There are a few capital water colours by P. F. Poole, R.A.; some admirable bits by Jules Lessore, as Nos. 134, 133, 141, and 146; studies of marine and street effects, and a few well-painted pieces in oil, by P. R. Morris; the "Last Load," by G. Cole a rich sunset piece, "Early Spring," by H. Friis, and one or two capital sea-scapes by C. F. Lörensen. The Willett collection of English pottery is also interesting. Pastoral and Bacchanalian pieces abound, some very curious, the "puzzle jugs" (17th century), in a brown glazed ware, are quaint; and the delft-ware and painted porcelain contain a few unique specimens of the art.

ROYAL ARCHÆOLOGICAL INSTITUTE.

VISIT TO NORTHAMPTON.

[FROM OUR OWN REPORTER.]

THE distinctive feature by which the Northampton meeting of the Royal Archæological Institute will be recalled to mind in future years will probably be the excursions to churches and manor-houses. The ecclesiastical buildings visited during the eight days afford typical examples of every phase of English architecture, from the most remote period to the advent of the Reformation. They may be roughly divided into two groups—the rude and early structures at Brixworth, Earl's Barton, and Barnack, and the highly elaborated edifices thickly sprinkled on the banks of and hill-sides overlooking the Nene. The three churches included in the first series are the best known of the reputed Saxon remains. In each the tower—square, massive, and unbuttressed—is the characteristic feature, and from the elevated sites on which they stand, the thickness of walls and narrowness of openings, it is very likely that they were often used for military purposes, especially as places of refuge, although this might not have been the ruling idea in the design. The use of undoubtedly Roman materials at Brixworth suggested that it was originally a basilica, but the

theory left unsolved the problem where the Roman population dwelt who used so large a hall of justice, and must be abandoned by any one who notes the inaccuracy with which the arches are struck, and the general roughness of walling construction. The long and short work and free use of crooked stones dovetailed into one another in the two other examples, appears, as was long ago propounded by Parker and others, to indicate the wooden origin of the style. The examples of Late Norman architecture examined during the week were numerous, and peculiarly elaborate. This chiefly applies to doorways, the archivolts of which are divided into many members and profusely ornamented; but many of the windows are notable, and the blank arcading in the chancel at Rothwell, and grotesque caps at St. Peter's, Northampton, should not be forgotten. The Round Church at Northampton did not receive the careful examination it deserves, possibly because it was so near to headquarters. Thirteenth century work was but poorly represented. The tympanum of the west portal at Higham Ferrers, Barnack south porch and spire, the foliaged and floriated capitals at the latter church, and the deep bell-mouldings in the nave arcades at Rothwell, are the only details worthy special mention. It is in the work of the succeeding century and a half that church architecture is best exemplified, and a vivid impression will be left of the exquisitely-tapered spires on the banks of the Nene. These are generally of broach form, with remarkably narrow squinches at the change from the square to the octagon, and with plain arrises; but several of the later examples are richly crocketted, and spring from within the tower parapet, the junction being marked by small eight-sided turrets at the angles, and flying buttresses. Many of the parapetted spires have since needed partial rebuilding. All the best examples of either class have three tiers of alternated spire lights. The mode in which a swelling is given at these points, so as to give a good entasis to the general outline, deserves careful study, for the difficulty of effectually treating the projecting gablets is not often successfully grappled with in modern work. The way in which strainer arches across transepted naves are pierced and decorated so as to add beauty and even mystery, as at Finedon and Rushden, is interesting to those having to deal with wide naves, although the expedient will rarely be imitated at the present price of iron tie rods. The windows of these Decorated churches are generally filled with reticulated tracery, often approaching a flamboyant character. Often a square head is used, which would, at first sight, indicate a later date than can fairly be assigned to it. The woodwork of these and the Perpendicular churches is generally of high merit. In several instances octagonal stages have been added to square towers in the 15th century, but the effect is rarely satisfactory, the outlines as seen from the ground being confused. Good Jacobean pulpits of carved woodwork were seen at Irchester and Castle Ashby. The screen at Holdenby, of about the same date, is heavy and incongruous, although the work itself is well executed. The effigies, brasses, and other memorials seen were very numerous, and fully merited the eulogiums expressed in Mr. Bloxam's paper; the priest's brass at Higham Ferrers gave rise to a warm discussion, and, although the idea that the tomb was erected for John of Gaunt must be given up, it was almost conclusively established that the tomb is that of Laurence Seymour. An interesting point was that a number of the Late churches visited are dated, in one case the actual contract for erection being extant.

The mansions visited were chiefly buildings of the Elizabethan period, the original plan consisting of a centre and projecting wings. In most instances the quadrangle was completed in the seventeenth century, very often with a low screen. The principal rooms are *en suite*, and look not upon the quadrangle, but outwards. All the houses visited, with two exceptions, are set in low, and probably damp, situations, and too little attention seems to have been paid to selecting the best aspect for the principal front; the chief rooms at Drayton look to the north. The grouping of turrets and chimneys is often extremely picturesque. The treasures of furniture, paintings, china, and books with which they are stored could not be seen to advantage as the houses are at this season in course of refurbishing.

While the meeting has shown the appropriateness of the boast that Northants is a "county of spires and squires," there have been a few other objects of interest scanned more or less cursorily. Several examples of defensive earthworks were seen. A fine Roman camp was viewed at Irchester, but it would almost have required ten hours instead of as many minutes to have properly mastered the arrangements and examined the remains. The mediæval castles were but fragmentary—Rockingham being the most important; those of Northampton and Fotheringhay are little more than mounds and foundations. Mention should also be made of the Eleanor memorials, of the very complete collegiate buildings at Higham Ferrers, and of Tresham's eccentricities at Rothwell and Rushton.

As usual, the town in which the meeting was held was almost neglected for more distant excursions. How many members visited the quaint heavily-timbered house, dated 1595, which stands at the north-east angle of the market-place, and challenges attention by the Welsh inscription over the door? or so much as saw the gabled home of the Hazelrigge's in Marefair? or searched for traces of St. James's Abbey in the walls beyond West-gate? The chief interest lay in the excursions; these were confined to the county limits, and the heavy programme was almost completely carried out. The papers read at the sectional meetings were more numerous than usual; but they were nearly all historical, topographical, or genealogical in character, only in a few cases touching on matters architectural. The local president, Lord Alwyne Compton, struck the right keynote in the restoration controversy in his opening address (it is critically treated in another column). Restored buildings were, as a consequence, scanned with unusual vigilance throughout the week, and the incumbents of churches as yet adorned with the plaster, pews, and "properties" of the last century were offered advice gratis and without stint.

But we must resume our journal of the week's proceedings.

THURSDAY.

The annual meeting of the Institute was held in the morning at the Town Hall, when the annual report was adopted, and a resolution passed, expressing the regret of the members at the proposal to restore a high-pitched roof to St. Alban's Abbey.

An excursion was then made to the noble cluster of spired churches on the hills on either side of the Nene, and near the eastern border of the county. Wellingborough being reached by train, carriages here took the party to the site of the Roman camp at Irchester, which has recently been excavated by the Rev. E. S. Baker and a committee.

IRCHESTER CAMP

Occupies the summit of a knoll overlooking the Nene valley, and extends over an area of 22 acres. It is surrounded by earthen walls and ditch. Mr. Baker said there is every reason to believe it was formed about 48 A.D., by Osterius, for the defence of the southern part of the kingdom against the savage and unsubdued northern peoples. The earliest mention of the encampment is, however, that by Dr. Morton, the county historian of Queen Anne's time, who gives the measurements of the walls, none of which are now above the ground level. The site had then, and has ever since, served as a quarry for building stones. The present excavations have been carried on at the boundaries of the site, and have exposed a circular bastion at the south angle, and at the north-west end the foundations of parts of the guard-houses on either side of the gate, and at intervals all round the area walling of about 9ft. in thickness. The masonry is chiefly of thin laminæ of local stone, disposed herring-bone or flat, and here and there a tile of about 3in. in thickness; at the angles and gates large stones pierced with "lewis holes" for lifting them are used. In the course of the excavations a few coins of the later emperors, and bushels of broken pottery have been found, and are preserved at Irchester vicarage, the cleaning out of two wells and some cisterns having yielded many Roman relics. In the Roman cemetery, 500 yards away, were found some stone coffins. The visitors made the circuit of the walls, entering some of the excavations, and a few went to the vicarage to examine the treasures there collected. A vote of thanks was passed to the landlord and tenant of the camp site, who have furthered the work of discovery. Mr. Fairless Barber suggested that the Roman works were covered by mounds for defence at a subsequent period, as at Templeborough, and described the recent discoveries at that station.

Irchester Church, next visited, has a slender and lofty broach spire, connected by very narrow squinches with the tower, with small spire lights, and is a type of many others seen in the course of the day. Red and grey stone are alternated in patches and broad stripes on the external walls of these churches with good effect. The chancel is nearly all Early English, with later sedilia and piscina. The font is of Transitional character, and has upon the round part four figures, with nimbed heads. The church is one of the few yet unrestored, and the rector asked for suggestions as to the process. It was suggested that the south chancel wall, now blocked up, should be buttressed, and the late thirteenth century windows re-opened; that the slightly later parclose to chantry chapel, with its lace-like carved upper members, should be left intact, together with the Jacobean pulpit, the handrail of which is the upper portion of the old rood screen (and the north base was found to be built into a pew); that the few high pews should be replaced by benches resembling the old ones in the west end of nave, similar elaborated carving being, if possible, introduced into the backs; and that the whitewash be removed from walls.

RUSHDEN CHURCH

Has a magnificent tower and spire, the handsomest and best proportioned in the district. The lower part of the steeple is Early English, but to the narrow west entrance have been added peculiar flying buttresses. All above this porch is Late Decorated. The spire is set into a parapet, and has flying buttresses at the angles; it is ornamented at the angles with large bracket-shaped crockets, and the taper form swells at the insertion of each of three tiers of spire lights. Over the south porch is a chamber, which, prior to the passing of the Poor-Law Act, was allotted by the parochial authorities as the residence of an old woman, who had to clamber up and down by a ladder—the ancient staircase being blocked up. The plan of the church is unusually broad; the nave and chancel are wide, and have north and south aisles, while flat transepts project a short distance. It was restored three years since by Mr. Gordon Hill, who has wisely allowed all broken carvings, mouldings, and ornaments to tell their own tale uncompleted. The exterior of the church is battlemented all round. The north transept is the earliest portion, and may be assigned to 1260. The east end of the north aisle is walled off internally as a sacristy, and marked externally by circular turret. Just outside this is an altar tomb—an unusual position for such a memorial. On entering the church the most noticeable feature is a strainer arch of the latest Decorated period, with pierced panelling and a reversed arch above, spanning the nave at the western side of transepts. The effect of this constructional feature, rendered necessary by the insufficient strength of walls for width of roof-span, is very fine. Between the south aisle and transept is a Perpendicular arch, with singular mouldings of a class in use at an earlier period, and supported by angels. Carved on the voussoirs is the statement: "Yis arche made hue bochar and julian hise wyf of whos sowlvs God have merci upon—amen." A beautiful parclose of the same period crosses the arch and incloses the south transept, and other screens cross chancel arch and north aisle.

HIGHAM FERRERS.

The chief interest here was around the group of buildings raised by Archbishop Chichely in the town of his birth (the church, beautified by the prelate, refectory, bede-house, cross, and college). Of the last-named institution nothing

but a ruined shell, now put to the meanest uses, remains in the main street of the town. The church, formerly collegiate, is the finest in this district of fine churches, and the exterior, with its great west tower, terminating in crocketted spire, and long ranges of buildings, with low roofs and uniformly-battlemented parapets is very striking. The building has two naves and chancels of equal length and width, and an additional north aisle; thus showing three ranges of piers internally. The peculiarity in plan was caused by the building of a very large aisle and lady chapel about the middle of the 14th century, to the north of the original nave, chancel, and west tower, the second north aisle being still later. The lower part of the tower is of very Early English character; the west portal has a double entrance, divided by a shaft, while above is a typanum filled with circles containing sculpture of events in our Lord's life, with diapered work between. These carvings are executed in a free bold manner in Late Transitional style, and show signs of having been painted. The tympanum subjects were minutely examined and raised some controversy. The tower and spire are much like those at Rushden, but it appears, from an inscription on the former, fell down and were rebuilt in 1631-2. Richard Atkins, of Northampton, the workman, seems to have copied and replaced the old spire very successfully. Internally the church appears very wide and lofty in proportion; it was restored some time since by the late Mr. Slater. The south arcade is Early English, the central one Decorated, and the northern one somewhat later. The windows are large, many of them being square-headed, as is usual in this locality. The screen is of Late Perpendicular character, and was probably erected, and the twenty stalls with their varied misereres added, by Chichely in 1415, when he founded the college. Between the lady chapel and chancel is an altar tomb, on which are carved the three lions of England and other arms. The upper part consists of a marble slab, on which is a very large and well-executed brass, showing a priest in eucharistic vestments, with emblems and figures of apostles, and other devices. The arch above the tomb has been stencilled with large butterflies. A sharp debate arose as to the tomb and brass, concerning which, the tradition is that the former was built for John of Gaunt, but not being finished when he died, the great Earl of Lancaster was buried elsewhere, and the tomb appropriated for the then rector, Laurence St. Maur, who died in 1283. Lord Alwyne Compton called attention to the tiles in the chancel, which were in the best type of Decorated; the patterns have been worn out, but can be traced as they were incised. To the west of the church is Chichely's college refectory, now used as a schoolroom (the reading pulpit, approached by a staircase, is still perfect), and to the south the bede house. The latter was formerly divided by plaster partitions into 14 cells, inhabited during the last century by as many paupers. The place became too ruinous to house them, and fell into decay till recently almost rebuilt by the townspeople. It contains some good fragments of stained glass. Between this building and the refectory—both fair specimens of their period—is the rectory, much modernised. In front of refectory, is the diapered stem of a cross set on steps, and in the main street is another, the base of the latter being bricked round, and the upper part hung with irons supporting a lamp. At Higham Ferrers, rich enough in buildings to have profitably occupied the day's study, the party divided—one section going on by rail to Thrapston, and thence to Islip, Lowick, and Drayton; the other staying to examine the grand group of churches close by—Raunds, Finedon, and Irthlingborough.

Islip Church is a well-proportioned building, with tower and crocketted spire, and large and lofty windows, and is throughout of one period—transitional Decorated and Perpendicular. It was restored in 1864 by the late Mr. Slater. Mr. Parker remarked upon the south arcade that it showed local and peculiar treatment—a narrow pier projects north and south, with attached columns on the sides carrying the caps to arches.

Lowick Church is of yet later type of Perpendicular. Into the pinnacled and battlemented tower is set an octagonal lantern, with other pinnacles at each angle; the composition, as a whole, is heavy, and compares unfavourably with a somewhat similar lantern at St. Dunstan's in the West, Strand. In the north aisle are windows containing deep-toned stained glass, all (with an exception) of one period, and that somewhat anterior to the church as it now stands. The figures are prophets and kings, and in the heads saints, no canopies being represented. There is in the church a series of costly memorials—brasses, effigies, and classical figures of the successive owners of Drayton House and Manor during the past five and a-half centuries. This series commences with recumbent figures of one Ralph Greene and Catherine, his wife, executed, we learn, by an indenture yet extant, by Thos. Prentys and Robert Sutton, "kervers, of Chellaston, in Derby," for the sum of £40; the last is a marble allegorical group upon the tomb of Charles Sackville, fifth and last Duke of Dorset, died 1843.

DRAYTON HOUSE

Affords one of the best representations of the English country seat of Queen Anne's time. Set in a well-wooded and extensive park, the mansion, "all towers and turrets," as Horace Walpole pithily describes it, is surrounded by a trim and close-cropped garden. The house was rebuilt, as appears by a date on a chimney, in 1584, with the exception of the Edwardian screen which forms the chief front; but various additions were made in William III.'s time, including the capping of the Elizabethan turrets with lofty cupolas, and the inclosure of the grand courtyard in front with lofty wrought-iron gates of a good pattern. After seeing the formal gardens the visitors were shown the many treasures—eighteenth-century paintings and furniture, old books and china collected in the mansion, which retains much of the Italian decoration with which it was ornamented prior to a visit by William III., and were afterwards offered refreshments in the great hall by the hospitable owner, Mrs. Stopford Sackville.

Raunds Church, visited by the second section, has a highly-decorated and massive Early English tower, with a singular pedimental set-off. Above is a tall spire, rebuilt in 1826. The chancel and its aisles are of the same period; the north and south aisles are Decorated, with later features introduced. The east window is fine Early English; indeed, all the work here of this period is good. The Decorated chancel arch, which has been inserted into earlier work, is very singular, and has hollow mouldings on the east face and the ball flower on the west. The church is one of Sir Gilbert Scott's restorations.

Stanwick Church has a unique Early English octagonal lantern of great beauty, with a fourteenth-century spire. The body of the church is of the same date as the tower, but both this and the south aisle have been greatly altered in Perpendicular times.

Irthlingborough Church,—This, says Mr. Hartshorne, hon sec. of the Institute, in his accurate and well-written "Notes," is a most curious and interesting church, its peculiarities arising mainly from the use made of the Norman foundations for the thirteenth-century church, from the enlarged building that was required when the college was founded in the time of Edward III. (1376), by John Pyel, and from the domestic buildings then added, which do not exactly tell their story. The most remarkable feature is the ponderous tower, a partly domestic structure, with its lofty lantern. This is attached to the main body of the church by the western porch, and has vaulted chambers and other domestic features connected with it. They were probably offices of the college. It is evident that an Early English church was erected on Norman foundations, and that Pyel's alterations and additions include the tower and the domestic buildings is proved by his arms on the western doorway. The chancel contains the return stalls of Pyel's foundation. There are effigies of Pyel and his wife, and Elizabeth Cheyne, all mutilated, and a good canopied tomb in Purbeck marble, late fifteenth century.

Finedon Church is of great size and beauty, with transepts. The whole building, with the exception of the tower and spire, which are rich Perpendicular, is Early Decorated work. The details throughout are of the best kind. The chancel screen is of stone, an unusual feature in Northants. A strainer arch (more elaborate in carving than the one of similar class seen at Rushden earlier in the day) takes the thrust of the western walls of the transept. In the room over the porch is a library with a curious collection of divinity and valuable editions of the Fathers.

FRIDAY.

Sectional meetings were held at the Town Hall in the morning.

SEPULCHRAL MONUMENTS AND EFFIGIES.

Mr. J. Evans presided over the antiquities section. Mr. M. H. Bloxam read a paper on "The Sepulchral Effigies, both Sculptured and of Brass Incised, of Northamptonshire." The county was, he observed, so wealthy in ecclesiastical, military, and civil memorials that a history of the costumes of the past five centuries could be fully illustrated by examples to be found within Northants. A discussion took place as to the person represented by a brass upon an altar tomb under the Easter sepulchre in the chancel of Higham Ferrers Church. Lord Alwyne Compton read a paper in which he urged that it was, as generally regarded, that of Laurence de St. Maur (or Seymour), who held the living in 1283. The brass undoubtedly depicted a priest, and the arms were those of the Earls of Lancaster (the patrons of the living), the three lions paramount of England and those of Grendon and St. Maur, the latter being like those borne by a Laurence de St. Maur, three generations earlier. Mr. Stephen Tucker ("Rouge Croix") doubted the identification of the shields. Mr. Bloxam was disposed to date the costume and style of the monument eighty years later than St. Maur's death. The Chairman adduced reasons for disbelieving the tradition that the monument was originally intended for John of Gaunt.

THE BONES IN ROTHWELL CRYPT.

Mr. S. Sharp read a paper upon the piles of bones in the crypt beneath the south aisle of Rothwell Church. These have been vulgarly computed to represent 30,000 to 40,000 men who fell in some great battle, doubts being felt as to whether this was fought between Britons and Romans or between Parliamentarians and Royalists. The lecturer showed that the bones only occupy a cubic space of 1,275ft., and that although skulls and thigh bones predominate, they only represent a maximum of 4,000 human beings. They were probably piled there as an ossuary in the 17th century. In the discussion which followed other instances of these charnel-houses were named, and Mr. Sharp' conclusions were admitted. In the historical section Lord Henley read a paper on "The History of the States d'Etat of France." A hasty visit was afterwards made to several buildings in the town, the well-known

ROUND CHURCH OF ST. SEPULCHRE,

Being the chief attraction. The whole church was restored by Sir Gilbert Scott. The plan is the usual one to this small class of buildings—a circular nave, long choir, and presbytery, but to this have been added a 15th-century western porch, tower, and broach spire, of heavy character, a Transitional Norman north aisle, and two south aisles of Decorated character, and recently, by Scott, an apse and eastern extension to aisles. The eastern piers and voussoirs above in nave and choir are banded with red and white stone. The circular portion is formed by eight massive circular columns of red sandstone with varied Transitional caps and bases. These shafts carry pointed arches inclosing an octagonal vault now filled with woodwork and covered externally by a steep leaded roof. In the centre is a highly-carved modern font, with cover hanging by chains from above. This round portion is lighted by 14th-century windows, except those on north and south, circular-headed.

A road excursion to Earl's Barton and Castle Ashby took place in the afternoon. On the road the fine Transitional tower of Weston Favell Church was looked for, with the more interest because James Hervey, author of the "Meditations Among the Tombs," was its rector, and lies buried here.

EARL'S BARTON CHURCH.

The rude square western tower, built of long strips of stone crossed by shorter ones, and the spaces between filled in with rubble, is the chief attraction in this well-known church. It is of three stages, battered on face, and without buttresses; above the ancient portion being a much later stage and an embattlemented parapet. The western entrance is through a plain round-headed door, with deep scroll mouldings and ornamented imposts. On each side are round-headed panels, carried as arcading round the north and south sides. The windows in the tower are mere slits through the massive walls, and are flanked and divided by several different classes of mouldings; three of these occurring on the lower stages have arrow or triangular heads, the others are rectangular. The plaster has recently been removed from the older portion of the tower, thus exposing the rubble work, which is seen to be of the rudest and roughest description, and now seamed by extensive fissures, especially on the south face. The body of the church is later than the tower, and has been in course of restoration during the past seven years under the care of Mr. R. H. Carpenter—the total sum expended having been about £4,000. The south door is late Norman, and of three highly-enriched orders; the long and narrow chancel is chiefly of the same period, and seems, from a projecting jamb remaining on north side, to have originally terminated in an apse. The chancel walls are covered internally with zig-zag arches in groups of three, the whole surmounted by a fine billet moulding. The wall above this arcade varies in thickness, and it was suggested that that indicated a tripartite division, but the continuity of the billet moulding militates against this. In the south wall is a piscina of unusual form and a square locker, and the arcade rises for sedilia in three arches. On the north side this work, which is freely executed, has been cut through to allow of the construction of an organ-chamber. The chancel clerestory seems coeval with the building, the openings being deeply splayed inwards, revealing the great thickness of the walls. Across the chancel is a Early Perpendicular rood screen, uncoloured. The nave contains traces of all classes of work to Late Decorated, the arcade and aisle windows being of the latter period. Outside the church Mr. Parker directed attention to the workmanship of the tower, which, he contended, appeared to be done by carpenters and not masons—the bracing of long and short work, the irregular and crooked pieces of stone used as imposts being referred to in support of the theory. He should ascribe the period of erection to the days of Canute—the beginning of the eleventh century—certainly anterior to that of Deerhurst, Glos., visited by the Institute last year, and which is dated 1056. Mr. Hartshorne considered the latter the older church, and it was pointed out that this at Earl's Barton is not mentioned in "Doomsday." The theory as to the use for defensive purposes of these early towers was broached. The incumbent stated that it was intended to restore the tower, and asked advice on the matter; the general response was to "do as little as possible."

CASTLE ASHBY.

Standing, as it does, on high ground, and with an out-look upon trim Italian gardens and terraces, and beyond these upon magnificent trees in avenues and clumps, Castle Ashby is a fine example of an English stately hall of the earliest phase of Renaissance. The house forms a closed quadrangle three stories in height, the fourth side being a screen of two stories, with octagonal turret in the court-yard at each end of this lower portion. The most singular feature of the house is the use of lettering in the balustrade which surmounts the house, and on the terraces in the gardens. The inscriptions are chiefly in Latin, those on the house being from Psalm cxxvii., 1, 2, "Nisi Dominus Ædificaverit," &c., the letters of pieces of stone nearly 3ft. in height; those in the gardens are, together with the vases which occur at intervals, of terra cotta from Blashfield, near Stamford. The visitors having enjoyed the view from the roof-leads up the great avenue to Yardley Chase, and over the Nene valley, re-assembled in the great saloon, where Mr. R. Scriven read a paper upon the history of Castle Ashby, tracing it back to the Asebi mentioned by chroniclers of Edward the Confessor's time. He showed how the estate was conferred by William the Conqueror on his niece, the Countess Judith, and then followed its transfer by marriage or sale from one family to another till it was purchased by Sir William Compton in 1573, since which time Castle Ashby had remained in the possession of this family. The old castle on the site had, three centuries since, fallen into ruins, and was described by Leland as "now clene downe, and made a septum for bestes;" some of the foundations were dug into in 1860 during alterations. Henry Lord Compton began the rebuilding of the house in 1583, completing it, as three sides of a quadrangle, in 1589. The fourth side, containing a long gallery and a chapel, was added from the designs of Inigo Jones in 1620. Jones made designs for the reconstruction of the whole building, but these were never carried out. Two of his floor plans and some elevations are engraved in Campbell's "Vitruvius Britannicus," with no intimation that these chiefly represented a design and not the actual structure. The old estate accounts show that in 1719 ten men were at work adding a bow window, still existing, and in 1720-22 fourteen men were employed demolishing walls and rebuilding, when a recess in north front of court-yard was filled up. The wages paid in 1723 were, to carpenters, 14d., and to labourers, 8d. a day. Till 1771 the great hall in which the members of the Institute were assembled had a high-pitched roof and gable, and the accounts showed how 45 men were paid for taking this down, laying new floor, making a flatter roof, and forming a plaster ceiling. The design of that ceiling was very poor, and it has recently been replaced. The series of inscriptions had been gradually enlarged and completed as they now appeared. The accounts showed the gradual planting of the estate with trees, and the laying out of the grounds as they now appeared, by Lawrence ("Capability") Brown, in 1760. Lord Alwyne Compton remarked upon the portraits on the walls of the room, and upon the very fine oak chimney-piece, dated 1601, and brought from Sir John Spencer's at Canonbury. Other rooms were afterwards shown, and also the vaults beneath the house; the groining is supported by round columns, with deep neck to mouldings; the date was approximately fixed as that of the new foundation by the use of the Tudor rose in some of the bosses.

The little church in the park, which has been restored by Mr. Street, R.A., was then visited. The north doorway is of the latest Norman type, and is richly treated with zig-zag moulding and tooth ornament; diaper ornament has been traced and commenced upon the shafts below, but only a few leaf ornaments have been executed. The greater part of the church is of the Perpendicular period. The pulpit is reputedly from Inigo Jones's designs, and as he was engaged in the construction of the fourth wing to the mansion, this is probably the case; it is a panelled oak structure, with large styles and mouldings, but treated in quiet Classic spirit. In the north aisle is a cross-legged effigy, in Purbeck marble, of David de Esseby, c. 1268, which Mr. Hartshorne considers the earliest figure of a knight, and there is also a very perfect brass, that of a priest named Wm. de Erinine, 1401. The church is dwarfed by a colossal seated figure in marble, of the Angel of the Resurrection, by Tenerani, which is placed by the tower arch; it forms a memorial of the second Marquis of Northampton, and other monuments to the Comptons are to be found in the church.

WHISTON.

Another small church, built, according to the inscription in one of the windows, by Anthony Catesby, his wife, and son, in 1534, was next seen. It has a very short chancel, and is a good example of Late Perpendicular. At

COGENHOE

The members were entertained at tea by the rector, the Rev. C. H. Burnham, who afterwards pointed out the chief features in the church, including the arms displayed upon shields on the capitals of the Early English arcades. In the south aisle is the effigy of the founder, Nicholas de Cogenhoe, who died in 1280. The chancel is that of an earlier church, and has deeply-recessed windows.

In the evening a conversazione was held, at which the Rev. W. Monk, rector of Wymington, read an exhaustive paper upon "The History of Northamptonshire."

SATURDAY.

The greater part of the day was spent in a long carriage drive through Rockingham Forest, now in great part reclaimed and cultivated, but still containing many venerable trees; many avenues of elms, planted in the middle of the last century, were seen on the Buccleuch estate during the earlier part of the day; much of the timber is now past its prime, and the avenues, which are of great width, and measure in circuit 60 miles, have in their decay a melancholy appearance.

From the station at Kettering—the fine Perpendicular tower and the crocketted spire of whose church challenged attention even in a drenching thunderstorm—the members drove to

ROTHWELL

(or Rowell), where the long collegiate church afforded welcome shelter. The chancel is Norman, with very deeply-splayed clerestory windows and arcading beneath; the nave and tower are chiefly Transitional, the caps of arcades being carved with crisp free foliage; Mr. Parker described these arcades as among the grandest examples. The base of a central tower is visible inside the church, but has never been carried above the first stage. The transepts were destroyed in 1673. The font is very peculiar; it is five-sided, with a smaller basin of same shape set into the lower one and coupled to it by shafts; the carving is of the date of Richard I. On either side of chancel are late 13th century chapels, now shut off and used as vestries; their windows are filled with beautiful tracery, and in the north chapel are a series of coeval stone coffins (one 6ft. 8in. internal length), with floriated crosses on the covers. In the south chapel is a parochial chest formed of one piece of oak, 7ft. long by 1ft. 10in. across, and 1ft. 11in. high, with proportionately heavy slab cover. The nave fittings are of the last century. An external feature on south is the lofty pyramidal termination to the belfry stairs; it is of the conventional Early English type we find at Peterboro' and elsewhere, but is carried to the unusual height of about 20ft., so as to end on a level with the tower roof, two stages higher than the stairs. Most of the visitors descended to the crypt beneath the south aisle and inspected the musty and mouldering piles of human remains, packed in parallel rows, more than waist high, on either side of a central passage.

In the town the unfinished market-house, begun by the eccentric Sir Thomas Tresham, was visited. The design is Free Classic, with arched doorways and square-mullioned windows; only the massive walls have been built, and these are completed as courses to the height of two stories, and are adorned with friezes, the lower one being occupied by a Latin inscription, and the upper by a series of sculptured shields bearing the arms of Northants families. It is said to have been planned by John Thorpe, and in it are used several ornamental details uniform with those at Holdenby and Burghley.

RUSHTON HALL AND LODGE

Were next visited. Both were built by Sir Thomas Tresham, the fourth side of the hall being a Doric screen of later date. The buttresses, bays, and oriels, breaking the interior façades, give piquancy to the view in the quad, but the interest of Rushton lies in the extraordinary triangular lodge at the entrance to the park. Every detail and part is based on a system of threes, and the whole is a mystery. The ground plan is an equilateral triangle, each side measuring 33ft. 3in., and divided into three floors; on each side are three gables, and below each of these a trefoil window with a long gurgoyle between. Below are more elaborate windows, pierced with twelve circular glazed lights, arranged in triplets round central light; on each side are shields of arms and Latin inscriptions of 33 letters each. In the gables are panels containing mystic numbers, and the seven-branched candlestick, a sun-dial, and

stone with seven eyes. Quaint sculptures of birds and letters and figures are disposed all over the building. The structure is excellently built, and further cramped together by irons, forming on the faces "T. T.," "15," "93." The interior is planned as three hexagonal chambers, two of the angles being triangular cupboards, and the third the staircase. Some time was spent in trying to unravel the puzzles presented by the numbers, initials, and symbols sprinkled over the odd structure. Opinions were divided as to whether it was simply an architectural folly, or whether Tresham, who was persecuted till his death for having joined the Roman Catholic Church, did not design it as an emblem of the Holy Trinity.

A brief visit was paid to All Saints Church, Rushton, an Early English structure, restored by Mr. Law, of Northampton, where the altar tomb of Sir Thomas Tresham, grandfather of the builder of the lodge and hall, was examined. Upon it is a beautifully-executed effigy in alabaster of Tresham, who was the last prior of the order of St. John of Jerusalem. Over plate armour he wears the habit of the order, with a cross-fleury on breast. The church contains many modern stained-glass windows, by Clayton and Bell, and Powell and Co. Some modern slab memorials of the late rector's family have been inserted into ancient stones—in one instance cutting through the matrix of a fine brass.

GEDDINGTON CROSS.*

The carriages simply halted at and drove round this memorial of Eleanor of Castille. The cross is triangular, and stands on a hexagonal base above seven steps of similar outline. The lower stages are moulded to represent clustered shafts, and covered with deeply-cut diapering, the repeated figure representing the conventional rose set in a square panel; above, on each face, is a statue of La Chère Reine, resembling those at Northampton and Waltham, but not so well executed. Each figure is set in a niche beneath cusped and groined canopy. From the centre rises a column formed of six square shafts and ending in a mass of crocketted pinnacles. It is not certain if the memorial was originally finished with a cross; if so, all trace has disappeared. Grave defects in the use of the triangular form are, that the whole seems distorted from most standpoints, and that the statues can only be viewed in profile, the angle shaft which supports the canopy cutting through the figure when seen full face. No record exists of the building of this cross, which is supposed to mark the third resting-place of Eleanor's body on the progress from Hardby to Westminster Abbey, and it is not known whether the structure has ever been touched up since it was erected in the closing decade of the twelfth century.

KIRBY HALL.

A long drive through the forest brought the members to this great house, where luncheon (at so much a head) was served in the great dining-room, the bay window in which formed the subject of one of Mr. Langham's† sketches in our photo-litho pages two years since. The greater part of Kirby was built for Humfrey Stafford by John Thorpe in 1570-2; in 1577 the property passed to Sir Christopher Hatton, who employed the same architect to form the great quadrangle, and the great bay windows on the south were subsequently thrown out by Thorpe. Inigo Jones was employed by Lord Hatton in 1638-40 to build the south entrance, outer walls, and gateways, and to alter the screen of the inner quadrangle. The south front in the quadrangle displays the several orders superposed, Doric being on ground level. This leads to the grand staircase, above which is a fine coved ceiling in plaster, also designed by Jones. Thorpe's work can be readily distinguished by the singular coupled stone chimneys, the quaint oriels, with mullioned and transversed lights, and the ornamental use of fillets, squares, and circles executed in relief upon the masonry. The place was inhabited as recently as 1820; indeed, Mr. Burgess and others said it was in perfect condition five and thirty years since. It is now being dismantled; the roofs have been stripped off the east and west sides of the quadrangle; the floors have been chopped up for firewood, the handrailing of grand staircase removed, and the whole is woefully dilapidated; and in keeping is the ragged grass in the quad, and the weeds in the library. Yet the walls are perfect, the carving on gables, parapets, and pilasters is almost as good as when executed, and the arrises are sharp and true. According to the daily papers Kirby was offered for sale by auction a fortnight since by the trustees of the Earl of Winchilsea, and withdrawn at £23,000.

ROCKINGHAM CASTLE.

Mr. G. T. Clark, of Dowlais, escorted the members in a perambulation of the outer bailey, pointing out the massive entrance gateway, dating from 1275, by which they had entered the noble terrace overhanging the Welland, artificially scarped so as to render the position still more secure, the portion of a bastion still existing at the north-west angle, and the divisions between the outer and the inner courts yet marked by a flight of steps and a low wall between the gardens. Still following the outer line of defence, Mr. Clark said it was probable the western mound was thrown up by the Britons as a camp, and was long afterwards raised and strengthened by the Normans. The northern and north-east side is defended by the steep hill-side over the river; the western side by a natural ravine which narrows and shallows to the southern side. There, therefore, it became necessary to make other works, and accordingly the valley was deepened, and the earth thrown up to make the mound of the keep, and outer lines of ditch and earthern rampart were provided. Standing on the mound of the keep, Mr. Clark gave a rapid extempore sketch of the rise and growth and popularity of antiquarian pursuits, and of the increasing regard for topography by modern historians—Arnold, Macaulay, and Edward Freeman being instanced. Turning to the keep, on the site of which they stood, Mr. Clark detailed its characteristics as a fortress, and showed that a deep ditch once ran round the inhabited part, yet a residence on the plateau beneath. Traces of this moat yet existed on the eastern side of the house. The Normans replaced the early banks by ditches, and on the highest, where he stood, built a shell keep, either round or polygonal, and there were great walls round the keep, which inclosed the courtyard. All these buildings were gone, but there were traces of a curtain wall between the courts; but besides this there was another in front of the house. In all, there were three courts. The old castle was slighted during the civil wars, and much of the material was then carted away, and the ditches and banks were levelled. The history of the castle and of the royal forest of Rockingham was a very interesting one.—Time did not permit of an examination of the interior of castle, which was chiefly rebuilt in the time of Elizabeth, and scarcely of acceptance of the owner's hospitality, as the members were returning to head-quarters by rail.

At the historical sectional meeting in the evening, Mr. S. I. Tucker ("Rouge Croix") read a paper on "The Descent and Varying Armorials of the Spencers of Wormleighton and Althorpe."

On Sunday morning a special service was held in the Round Church, and was attended by the Mayor and Corporation and members of the Institute. The sermon was preached by the Rev. Canon Pownall, F.S.A., rector of South Kilworth, who took as his text Rev. xxi., 22.

MONDAY.

Fotheringhay and Barnack were the main points of this day's excursion, which was through the north-east part of the county, the journey as far as Oundle being performed by rail.

COTTERSTOCK—

Interesting because of its associations with the poet Dryden, who often visited his cousin, Mrs. Stewart, at the Manor-house, and who was himself baptised in the fine spired church of Aldwincle St. Peter's, a few miles south (and seen to the right from the train)—was first visited, a halt being made in the church while the rector, the Rev. A. J. Abbey, read a descriptive paper. The west doorway and tower are Transitional, with some singular projecting figures on second stage. The south porch is groined, the bosses being well sculptured with representations of the Trinity and Evangelists. This is 150 years later than the nave to which it is attached; the latter is badly lighted, and has surrounding the three internal sides a stone seat. Many of the peculiarities in the church are due to its having been connected with the college founded by John Giffard in 1339; the buildings stood on the north side, and have been destroyed, a farmhouse standing on the site. The church was reopened in May last after restoration at a cost of £3,000, from plans by Mr. G. E. Street, R.A.; Messrs. Hale and Sons, Salisbury, contractors; and Mr. Hems, Exeter, carver.

TANSOR CHURCH

Is as yet unrestored; the low square tower is almost concealed by ivy, and the walls are clothed with the same creeper. Inside are old-fashioned pews, a late roodscreen, and, in the chancel, a series of stalls removed from Fotheringhay Church; the misereres are carved with representations of eagles.

FOTHERINGHAY.

The Church, formerly collegiate, is Perpendicular throughout, the nave, aisles, tower, and lantern having been rebuilt in 1435, to correspond with the chancel, now destroyed. The original contract for building the nave is still in existence, and is between the commissaries of the Duke of York and William Harwood, freemason, of Fotheringhay. The Duke was to find "carriage and stuff," and Harwood was to have, as the work was done, £300. The octagonal lantern is better proportioned to the tower than most features of the kind, being loftier and not so large as to give to its springing the aspect of crowding. On the south side are very large flying buttresses from the aisles to the clerestory. The nave is lofty and well lighted; the east end is walled up. The tombs of the members of the royal House of York, erected by Queen Elizabeth's order, are expensive rather than imposing, and only interesting as specimens of the dying Tudor style.

Of Fotheringhay Castle nothing remains but traces of foundations, the ditches and hillocks marking the outer and inner bailey, the levelled space on the south side, where stood the great hall in which Mary Queen of Scots was beheaded (the hall was removed by Cotton, the antiquary, to Conington, Hunts), and the great conical mound, whereon the keep was built—it is yet moated round and uneven with foundations. On the other side of the village street is the hostel, containing fifteenth century fragments of stone carving.

At Elton the members should have divided, but Barnack and Burghley were generally preferred to Peterborough, and the party proceeded to the former village. After luncheon at the rectory, hospitably offered by the Rev. Canon Argles, the visitors saw a torso of Barnack stone, dug up in 1851 in extending the rectory, and pronounced to be late Norman, and the collection of paintings and old china in the principal rooms. The afternoon was spent in and around

BARNACK CHURCH.

The tower is the most interesting feature of the church. It is square on plain brick walls of great thickness, built of thick rubble work. Upon the faces of the walls are vertical strings of stone, alternated with other pieces running transversely into the fabric so as to bond it together. A plain string-course of the same character divides the tower into two stages, and just above this, in the centre on each side, is an upright slab, on which is carved a series of spiral lines set off from a vertical line. These few windows are triangular or circular-headed. There has never been a western entrance, but on the south side the middle course of long and short work ends in a keystone which forms the centre of a circular arch-moulding, formed of a single course of narrow stones, to a doorway. Inside, this tower has recently been cleared from the *débris* which had blocked it up since the 13th century, and now shows a triangular sedilia in the west side, set as a niche in thickness of wall, and the stone risers for seats carried around the other sides. The imposts of the arches are formed by laminæ of stone, with

* See illustration and description in BUILDING NEWS for August 11th, 1876, Vol. XXXI., p. 124.

† See illustrations in Vol. XXX. of BUILDING NEWS, pp. 194, 342, 466, published Feb. 25, April 7, and May 12, 1876.

projecting edges, irregularly disposed as to one another, and giving an appearance of great antiquity and rudeness to the whole. The sculpture of this portion of the building has never been finished. The church would be remarkable for the beauty of its Early English remains were this excellence not eclipsed by the tenon-and-mortice masonry of the tower. The south porch is one of the most beautiful of the 13th century. Beneath a steep gable is a wide entrance arch. This leads into a vaulted lobby, with a four-arched arcade on each side. The mouldings are deeply rimmed and sharply cut. Above the original tower has been added an Early English octagonal story, dying off into a plain and rather short spire; the blending of the eight-sided stage, with massive tower and conical cap, by large buttresses rising through the squinches at the angles, is worth notice.* The north arcade of aisle is of the same period; rather stiff curled leaves project from the caps, with much approximation to contemporary work at Canterbury. The south arcade columns have simple bell-mouldings and bands. There is some Decorated work in the church, but it is not of equal character to the earlier parts, the sedilia and piscina being especially heavy. The east window is good and peculiar, almost a counterpart of that at Merton College chapel, Oxford; it is of five crocketted trefoil lights, under a four-centred head, the tracery above the principal light being pierced. It has been filled with stained glass. Some discussion took place as to the large and deep hagioscope in the south of chancel arch, looking into a chantry; Mr. Micklethwaite contending that it served a twofold purpose of enabling the congregation and the officiating priest in the chantry to see the elevation of host at principal altar—Mr. Parker asserting that the latter was the sole purpose. This chantry is a fine Perpendicular addition, and still has the original parclose and other fittings. On the north side of chancel is an adjunct now used as vestry, and containing, in the windows, three heads in stained glass, of God the Father, a pope, and an angel, of about the 14th century. Mr. Parker showed where this was formerly divided by a floor so as to form a hermit's dwelling; and he suggested that its use might be revived if the sexton or pew-opener could be induced to take up his residence in it. Canon Argles hinted that the occupant might require a fire, or wish to keep a pig, which would render him an undesirable tenant. In the churchyard outside is a remarkable series of stone coffins, two of them very small. The dimensions of the internal cavity in the least of these are 23in. long, 5in. deep, 8in. in breadth at shoulders, and 5in. at feet. Canon Argles read a paper in the church, which we shall give in extenso in an early number. In it he advanced the theory that the tower was in early times used for trials by ordeal, and that the judge occupied the central niche, the jury being disposed in the side seats. He dwelt upon the "petrified carpentry" of this early portion, detailed works of restoration carried out in the church, and those still in embryo, referred to the entire exhaustion during the fifteenth century of the famous quarry of "Barnack stone," of which so many churches and several cathedrals were built, and showed in the arch connecting the chantry with the chancel the period when in this church other stone had to be substituted for that quarried in the parish.

BURGHLEY HOUSE.

Some of the members went on to "Burghley House by Stamford town," the palatial mansion of the Marquis of Exeter, and one of John Thorpe's best designs. The bay windows and cupolas, Tuscan columns and parapets, exhibit a clever combination of Tudor and Classic detail; the effect in the quadrangle is especially good. The walls and ceilings of the principal suite of apartments are covered with representations of classical subjects by Verrio, Laguerre, and Stothard; and among the art treasures hastily scanned by the visitors were the grand collection of paintings of the Italian school, the portraits in the Pagoda-room, and the almost numberless specimens of Grinling Gibbons' wood carvings of flowers and fruits.

* The tower and spire, and south porch, are illustrated in the Building News of June 25, 1875, Vol. XXVIII., p. 416.

In the evening sectional meetings were held at the Town Hall, Lord Alwyne Compton in the chair.

THE CLARENCE VAULT, TEWKESBURY ABBEY.

Mr. J. Tom Burgess, F.S.A., gave an address upon "The Opening of the Clarence Vault at Tewkesbury Abbey." He alluded to the visit that morning to Fotheringhay, and to the associations of the house of Clarence with the castle; the member of that family, George, brother of Edward IV., the one of whom he was about to speak, spent his early days there. A blue flag stone in Tewkesbury Abbey, between the lady chapel and that of St. Edmund the Martyr, had been historically known, from the Abbey Chronicle, as covering the entrance to the vault wherein, in 1477, the body of Isabel Neville, Duchess of Clarence, was buried, and there is little doubt that her husband, however he may have died, was laid beside her. The tomb was opened in 1745, and the bodies of a male and female were found therein. In consonance with the taste of the age, a local alderman, his wife, and daughter, were buried therein; the original bones were placed in a 13th century stone coffin, and replaced in a corner of the vault. It was again opened four weeks since in the course of restoration when the bones were found; the tiles which formed the crossing of the floor of the vault were those of the Lancastrians, and had apparently been removed from the original place when it was re-used by "the suns of York." Mr. Burgess protested against the proposed exhibition of the remains under a glass-case. This intention was generally reprobated, and a resolution was passed, requesting the secretary to write to the Tewkesbury Abbey authorities upon the matter. Mr. J. T. Micklethwaite, F.S.A., followed with a paper upon "The State of Churches in 1548," in which he minutely detailed the furniture and fittings, and their distribution in the churches in 1548, one of the earliest years in the period vaguely known as "the Reformation."

EASTON MAUDIT.

The Rev. A. J. Foster read a paper on "Easton Maudit." The church of St. Peter and St. Paul is all of the later Decorated period, and was completed at once, with the exception of the Yelverton chapel on north of chancel, with its strainer arch, formerly shut off from the church, and entered by a private external door. The spire is a capital example of Northamptonshire type, with three tiers of lights, and finished at the angles with pinnacles and flying buttresses; it was partly rebuilt in 1832. The church was restored 17 years since, at a cost of £2,530. The monuments are chiefly collected in the Yelverton chapel, having been removed at the time of the restoration. The Yelvertons are commemorated by some magnificent Jacobean tombs, besides slabs and mural tablets. The effigies of Sir Christopher Yelverton, Speaker of the House of Commons in the reign of Elizabeth and James I., and Lady Yelverton are of coloured alabaster and life-size; they exhibit the most minute detail of dress and ornament, executed in the delicate sculptural style of the period. On the sides of the tomb kneel the children—four sons on one side, and eight daughters on the other. Another of the monuments is that of Henry Yelverton, first Viscount Longueville, who died 1703. His effigy, in black gown and ruff, looks down from one of the shelves of a bookcase and surrounded by books. These books seem to commemorate his bequest of his library to Christ Church, Oxford. On a lower shelf lies his wife, and beneath kneel the sons and daughters. The canopy is supported by hooded mutes, upon whose cushioned heads rests the ponderous pediment of the monument, and between are emblems of death and burial. The colouring of the whole is very perfect, and notwithstanding the quaint conceit of the bookshelves, with their clasped volumes turned edge outwards, the monument is a remarkable specimen of the time when the Italian style had pervaded the island. In the course of a discussion which followed, Messrs. Tucker and Law deprecated, on historical and personal grounds, the removal of monuments; but admitted that where, as at Easton Maudit, such memorials obstructed light from windows or hid architectural features, they might be removed to another part of the church.

The Rev. J. H. Hill, of Cranhoe, exhibited a copy of a fresco painting discovered on the previous Tuesday in the manor-house of Medbourne, near Market Harborough. Parts of the manor-house date back to the reign of Henry III., but the fresco was executed, at the earliest, in James I.'s time, the subject being an esquire in feathered cap, doublet, and trunk hose, and the details of the frieze were drawn from Classic sources.

TUESDAY.

A concluding meeting was held at the Town Hall in the morning, Lord A. Compton in the chair, when votes of thanks were proposed to the Mayor and Corporation for their hospitable reception and the use of the Town Hall, to the local secretaries and committee, to those who entertained the members of the Institute on their excursions and in the town, to the readers of papers, to the local president, and to the secretary of the Institute, with special mention of his descriptive pamphlet.

CANONS ASHBY.

In the afternoon many of the members accepted Sir Henry Dryden's invitation to visit his seat, proceeding thither by road. Canons Ashby is an "unrestored" mansion of various dates, in part constructed out of remains of the priory of Augustinian canons near by, about the middle of the 16th century, and greatly enlarged in Queen Anne's time. The buildings, the earliest of which seems to be the octangular tower, inclose a small quadrangle. A very singular series of pipes, which conveyed water to the monastic buildings, remain in use. A series of terraces, overhung by cedars, descend from the house to the park and fish-ponds. Within, the chief apartments are the hall, hung with old armour and weapons; the dining-room, floored and wainscotted with the timber of a single oak, which grew in the park; the library, which is fire-proof, and above this the drawing-room, which has a fine ceiling and fire-place, dating from the middle of the 17th century. The church of Canons Ashby was a part of the priory establishment, and now consists only of nave, north aisle, and lofty pinnacled tower.

It was decided last week to accept the plans of Mr. Dreive for the erection of the new ward of the Cottage Hospital at Ramsgate, and Messrs. Paramor and Son's tender for the work at £565.

A mission school chapel was opened at St. Thomas, near Launceston, on Tuesday. The design is by Mr. J. Piers St. Aubyn, architect.

The new school buildings for the Middle School, Warwick, were opened on Thursday week. These buildings, which are of the Tudor period, embrace a master's house, a school-room capable of accommodating 125 boys, three large class-rooms, and crypt for a covered playground, and have been erected from the design of Mr. J. Cundall, architect, the Parade, Leamington. The work has been carried out by Mr. Thomas Mills, contractor, of the same town, at a cost of £2,638.

A memorial tablet, to the late Lieut. Lees, has been erected in York Minster by Messrs. W. H. Burke and Co. It is a simple Early English arched canopy of grey marble, relieved with alabaster bosses, and surmounted by a carved finial of white marble. The canopy is supported by two small columns of Irish red marble, with white carved thirteenth century capitals, and these rest upon a grey marble base, which again is supported by trusses of the same material.

The ancient parish church of Child's Ercall, Salop, is being restored by Messrs. Carpenter and Ingelow. Mr. Whittingham, of Newport, is the contractor.

A party of members of the Derbyshire Archæological Socity visited Lichfield on Saturday week. An interesting paper on the shrine of St. Chad was read by Bishop Abraham.

New baths were opened in Lodge-lane, Liverpool, last week. The cost of the building has been £1,800. The building is of brick, in the Tudor-Gothic style. It has been erected under the supervision of Mr. A. Duncanson, the contractors and sub-contractors being respectively Messrs. Thornton and Sons and Messrs. Haigh and Co. Mr. Hugh Davies was the clerk of the works.

The excavations are rapidly removing the last traces of Allhallows Church, Bread-street. Four new buildings are about to be erected thereon, the design of which is Renaissance, with some features of the Queen Anne period. Mr. Alexander Peebles, Salters' Hall-court, is the architect, and Messrs. Scrivener and Co., Fitzroy-road, the builders.

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THE PRINCE OF WALES' DINING ROOM AT THE PARIS EXHIBITION—MR. CLUTTON'S DESIGN FOR THE CHURCH OF THE ORATORY AT BROMPTON—HEREFORD CATHEDRAL—A SUMMER COTTAGE AT FORMBY.

OUR LITHOGRAPHIC ILLUSTRATIONS.

HEREFORD CATHEDRAL—REPRODUCTION OF ORIGINAL PRESBYTERY.

A PAPER read by Sir Gilbert Scott at the Thirty-third Annual Congress of the Royal Archæological Institute, held at Hereford last year, and reported by us in the BUILDING NEWS of August 10, 1877 (p. 137, Vol. XXXIII.), will afford the best description of this illustration. The members of the Institute, whose Congress at Northampton we are reporting this week, will remember how Sir Gilbert Scott supplemented his paper by the remarks delivered while he accompanied them round the building itself, which will also be found reported in the number of the BUILDING NEWS referred to above.

SUMMER RESIDENCE AT FORMBY, NEAR LIVERPOOL.

MESSRS. BELL AND ROGERS are the architects of the above house, building as a summer residence for R. R. Heap, Esq., at Formby, which is situated in Lancashire, midway between Southport and Liverpool. The shore portion of the estate is being laid out by the above architects, who have recently constructed some miles of new road, breakwater, and esplanade, and it is anticipated that in a short time Formby will become a suburb of considerable importance to Liverpool.

NEW CHURCH OF THE ORATORY, W. BROMPTON.

MR. CLUTTON thus describes his design, which we illustrate herewith. The plan is that of a church belonging to a community—viz., a cross with a dome, 60ft. in diameter, at the intersection. It also resembles the plan of St. Philip Neri, in Rome, as also "The Gesu," and the church of St. Charles Borromeo in the same city. The three doors of entrance open into a spacious loggia, which can be screened off or not at convenience; whilst to enhance the proportion, attitude, and dignity of the sanctuary and transepts, the vaulting is contracted considerably by the introduction of columns, as shown by the plan. The architecture is that used in the before-named churches, and is the Renaissance of the 16th century. The motive of the architectural treatment is based on the principle used by Michael Angelo in the building of the basilica of St. Peter—externally as well as internally—namely, in both cases, one lofty order with an attic. At the same time reference has been made to another work of that great architect in the application of a smaller order of architecture, interlacing internally, as well as externally, the greater or main order. I refer to the masterly buildings of the Capitol, at Rome, which now contain the Capitoline Museum. The advantage internally of this minor interlacing order is that it affords the very best development for the subsidiary parts of the plan, such as the side chapels, &c.; it preserves their proper scale in the design, makes each one an architectural unit of its own, and reduces to a proper proportion its architectural parts to make the introduction of painting, sculpture, and architectural decorations a consistent whole. At the same time the dignity of the main order is left in repose, and it fulfils its functions by a series of vertical lines throughout the entire length of the building, nearly 60ft. of unbroken height. A vault of 60ft. diameter, springing from that level, cannot fail to secure a majestic interior. It should also be a matter of observation that, as in the great church of St. Peter's, the exterior is the reflex of the interior; and although the exterior may suffer from the enforcement of so logical a treatment, it is better to accept such a sequence, even at the sacrifice of exterior effect, than attain a result, perhaps superior, but open to grave criticism, as in the case of the false lateral walls of St. Paul's Cathedral, and the peristyle treatment externally to a Roman thermæ internally, as in the case of the great Church of the Madeleine at Paris. Like the churches in Rome this design has no roof of wood. It is covered with a vaulting of brickwork, which becomes at once ceiling and roof, being covered externally with asphalte, and internally with stucco. The dome is of Portland stone, as are also the coverings to the chapels. The flooring is paved, so that it may be said not a particle of combustible material is used to carry out the design. The transepts, besides expressing a church belonging to a community, afford the very best arrangement for the organ and choir, and the several arrangements connected with the house. The materials to be used, subject to what has already been said, are open for consideration. Any stone for exterior purposes can be nothing but Portland, although the design lends itself to the use of terra cotta and brick. Internally a soft limestone might be advantageously used. The ceiling decoration in stucco—carvings, mosaic, and marbles can be added to any extent. The contemplated outlay to carry out this design is £100,000.

References to Plan.

A Corridor of house.	I Stairs to organ.
B Corridor.	J Calvary chapel.
C Chief sacristy.	K K Baptistry chapel and font.
D & H Spaces allotted for working sacristies, stowage rooms, sacristan's rooms (as may be required).	L L L 20 confessionals.
F F F Six chapels.	M Pulpit.
G Organ raised above floor on a tribune, with passage under same.	N Sanctuary.
H Space for singers.	P Stairs to engine-room.
	S Platform at back of altar for benedictions.
	T T Parlours.

PRINCE OF WALES'S DINING-ROOM, PARIS EXHIBITION.

IN the BUILDING NEWS for March 22 last we illustrated the exterior of the Royal Pavilion of the British Commission, and commenced our series of plates illustrating the English buildings in the Rue Internationale. To-day we are enabled to give a double-page view of the council chamber or dining-room in which the Prince of Wales holds his receptions to the commissioners of other countries. The apartment has a height of 22ft., and is lighted from a central light in the ceiling. This is filled with stained glass. The soffit of the ceiling is coppered and gilt, the panels being of enriched plaster. The cornice is supported by a deep cove of walnut, the whole being carved in a rich manner. The centre of the long side of the room is occupied with the mantel-piece, which is an elaborate example of finished workmanship. The upper portion contains a portrait of the Queen, by Angeli, executed in tapestry at the Royal Windsor Works*, from the original portrait in oils, which was lent expressly by her Majesty. The work is life-size, and the reproduction in tapestry is an admirable likeness. We are assured that this is the first occasion on which any portrait has been attempted in tapestry in England—at any rate in modern times. A wrought steel and brass stove is placed in the fireplace, the sides of which are lined with encaustic tiles. The walls over the dado are covered with tapestry, executed at the same works, representing eight scenes from "The Merry Wives of Windsor," and the whole series form one of the most important works of the kind yet produced. The scenes shown in our view show "Slender and Anne Page," "Ye Merrie Wives," and "Sir John Falstaff." The dado is massively treated, and extends round the room at the height of the mantel-piece shelf. The panels are inlaid with marquetry, and the pilasters are carved, as are the trusses over. A rich Axminster carpet, of special design, covers the floor. The chairs and portieres are covered with English velvet, and like the side and centre tables were made expressly for this apartment. Beyond the dining-room a view is obtained of the boudoir, where the decorations are more after the style known as that of the Brothers Adam. The table in the front of the picture has some of the specially-designed plate, executed by Messrs. Elkington and Co. The designs for the entire work of the Pavilion were prepared by Messrs. Henry and Hay, the artists, engaged by Messrs. Gillow and Co., who have executed the works of this as well as in the other rooms of the Royal Pavilion.

* A view of the new works was given in the BUILDING NEWS, May 24 last.

ARCHÆOLOGICAL & ARCHITECTURAL SOCIETIES.

BRISTOL AND GLOUCESTERSHIRE ARCHÆOLOGICAL SOCIETY.—The proceedings of the third annual meeting of this society were continued last week on Thursday and Friday. On Thursday the members visited Bristol Cathedral, when Mr. R. J. King read a paper on the architectural and other features of the structure. He remarked that there was nothing quite like this cathedral either in England or on the Continent. It stood in many respects alone, and a minute acquaintance with other English churches of the same period enabled even an unprofessional student like himself to recognise and appreciate its remarkable peculiarities. The great beauty of the edifice had not always been recognised. The great originality of the design seemed to him to have resulted in nothing but what was admirable. It was quite true that nothing precisely like the church was to be found anywhere else. The great distinguishing features were the lofty main arcade, with triforium or clerestory, the aisles of equal height, with nave and choir, and consequently admitting to those lofty and magnificent windows, which quite compensated for the absence of the usual stages above the arcade, the roofing, or rather the vaulting of the aisles, and the disposition and design of the sepulchral recesses. Altogether, none of those features were to be found anywhere else. There was no one church which contained them all except the Cathedral of Bristol; and if not one of the largest, yet, perhaps, it was the most peculiar, and by no means the least interesting, of English cathedrals. At the close of the paper, the members went round the cathedral, and the various details were examined. Various other places of interest in the city were also visited. On Friday the final meeting was held to pass votes of thanks, &c.

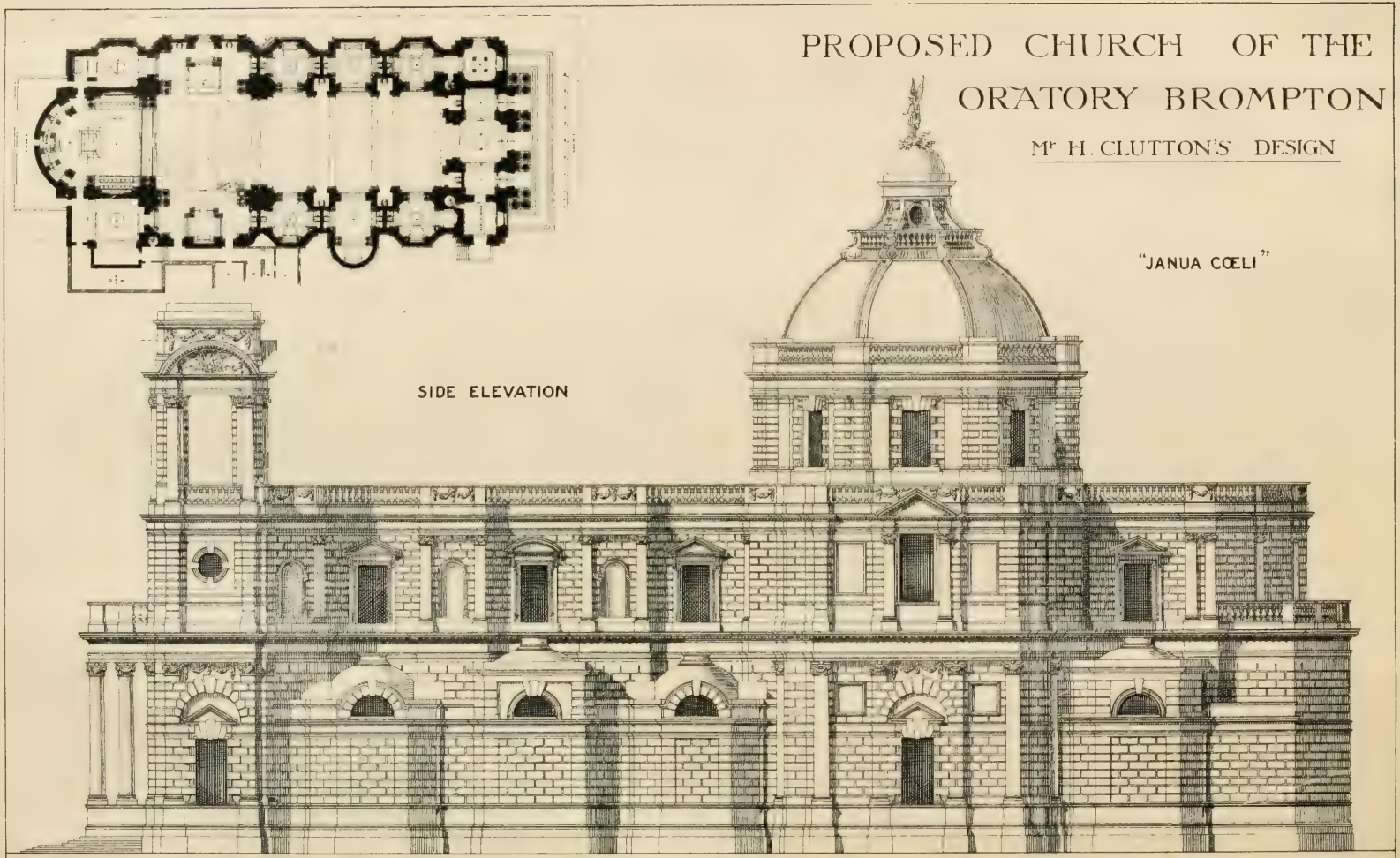
BUCKS ARCHÆOLOGICAL SOCIETY. — The Bucks Architectural and Archæological Society had a pleasant excursion last week. Special excursion tickets were issued from Aylesbury to Bourne End, whence the members were driven in four-in-hand breaks, waggonettes, &c., to Hedsor, where they were received by the rector. The party first proceeded to the church, and then to Hedsor House, the features of which were explained by Mr. Lynn. Passing on to the Duke of Westminster's property, the Rev. C. Lowndes read a paper on "Clieveden." Leaving Clieveden, the party drove to Hitcham Church, where the Rev. Mr. Frewer pointed out the features of interest. The company passed on to Burnham Abbey, of which only some fragments remain, now used as farm buildings. Mr. W. L. Rutton, C.E., read a paper upon the abbey, which is supposed to have been founded by Richard of Cornwall, in 1256. At Burnham Church a paper giving some particulars of the history, &c., of the parish was read; and, having looked at Burnham Beeches, Dropmore Park and Gardens, and Wooburn Church, the party sat down to dinner at Wooburn House.

KENT ARCHÆOLOGICAL SOCIETY. — The annual meeting of this society was concluded last week, on Thursday. Visits were made from Bromley to Orpington, to the priory and parish church, and next to Cudham, then to High Elms, the seat of Sir John Lubbock. The Roman Camp in Holwood Park, and Wickham Court were afterwards inspected.

Photo Lithographed & Printed by James Akerman 11 Queen Square W.C.

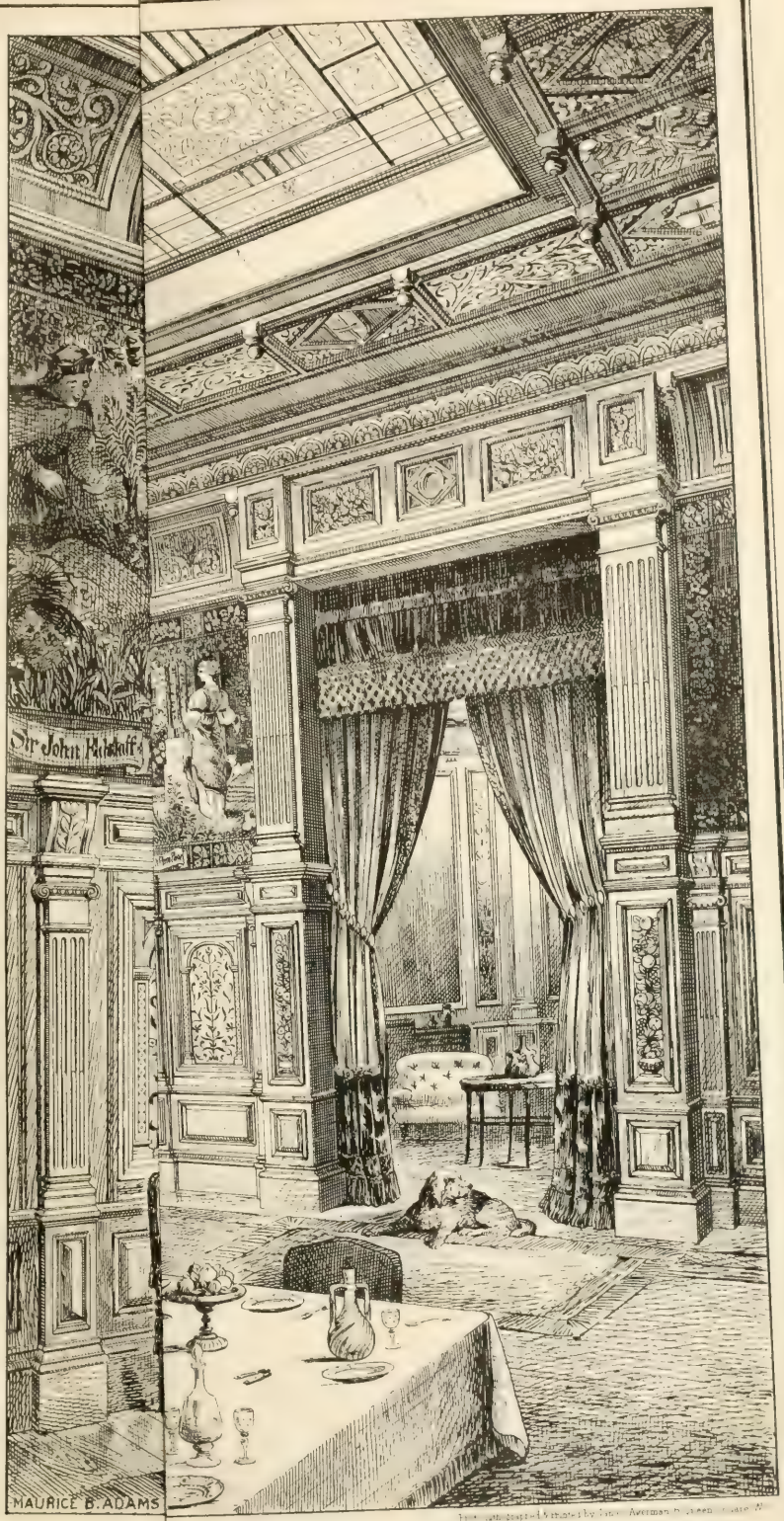
PROPOSED CHURCH OF THE ORATORY BROMPTON

Mr H. CLUTTON'S DESIGN



MAURICE B ADAMS

Photo Lithographed & Printed by James Akerman, 6, Queen Square W.C.



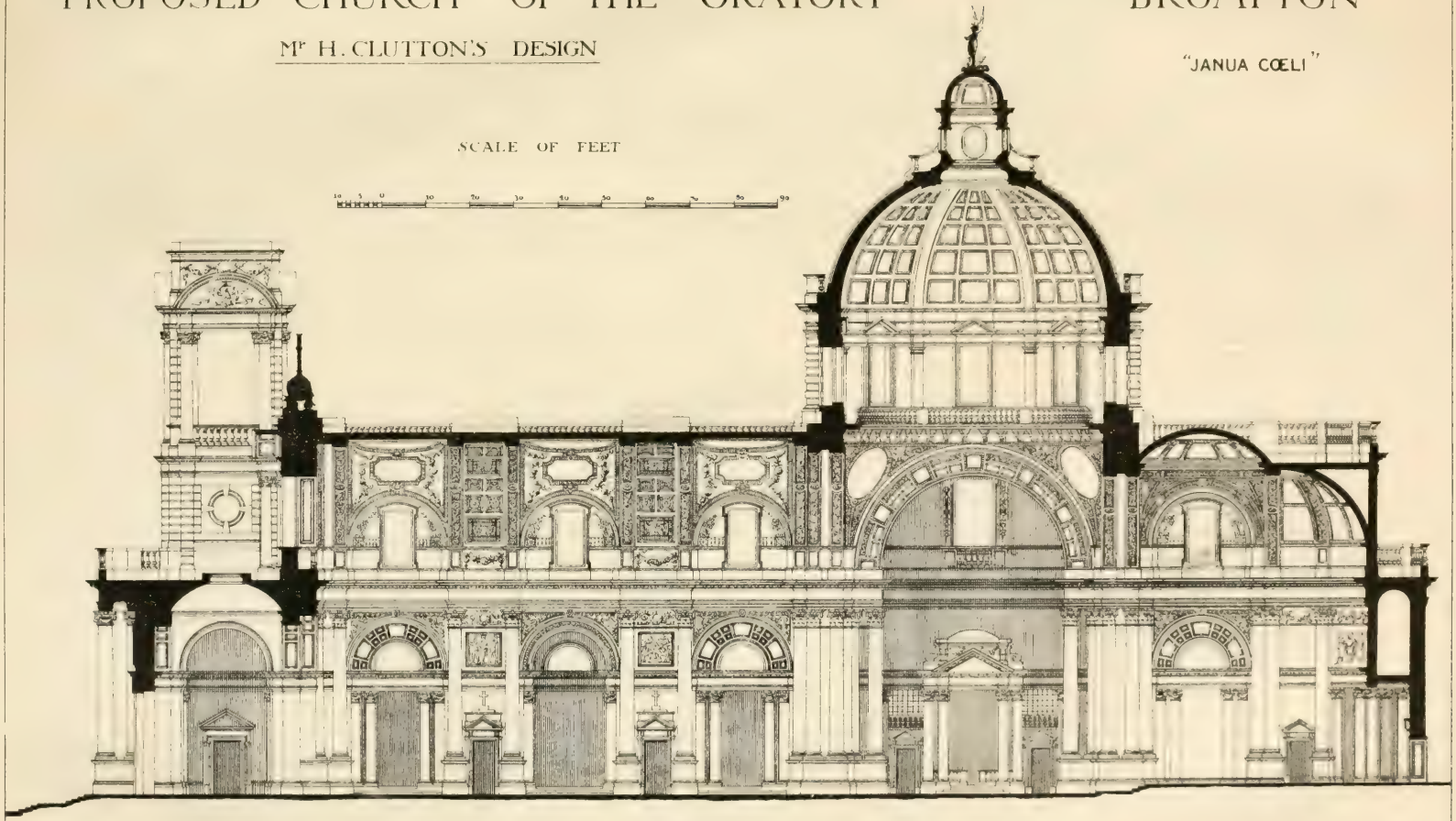
View · of · the · the · PARIS · EXHIBITION · A · D · 1878 ·

PROPOSED CHURCH OF THE ORATORY BROMPTON

Mr H. CLUTTON'S DESIGN

"JANUA CŒLI"

SCALE OF FEET



LONGITUDINAL SECTION

MAURICE B. ADAMS

Thos. Gillingwater Mintern Bros. Queen Square W.

J. Akerman Photo-litho. London

HEREFORD·CATHEDRAL – REPRODUCTION·OF·ORIGINAL·PRESBYTERY.

RESTORATION BY THE LATE SIR G.G.SCOTT.R.A.

BUILDING ON STILTS.

As it is almost a necessity in large towns to preserve as clear a space as possible on the ground floor, and to utilise every inch of frontage for shop display, it becomes of some importance to know what provisions for stability and public security we have. Go where we will we find large houses—many of several stories in height—built upon frames of timber or iron resting upon mere stilts, high above the ground level. These erections are literally houses built in the air—superimposed above our heads, and cannot by any explanation be considered really *bonâ fide* buildings. At the present moment one may see a dozen of these erections within a walking distance anywhere in London, and the most extraordinary thing is that there appear to be no definite regulations respecting them. Some are built on frames of wood, others of iron; there is no apparent security guaranteed to the public further than that a hoarding surrounds the site, and that a builder has his name prefixed thereto. It is true there is a Building Act, but the operation of that Act as often as not comes into force after it is of little use—that is to say, it is more curative than preventive in its action: instead of assisting, it finds fault and comes to the rescue when it is too late. During the last quarter of a century the old street buildings of London have suffered considerably from a process of undermining, known in the trade as "putting in a shop front," the consequence of the process being that the houses of many old streets look to be tumbling inwards. The centre portions of the fronts have settled in many instances seriously, the windows have been thrown out of line, and the appearance is too well known by every omnibus traveller who passes in monotonous rotation such miles of street frontages as the Pentonville or Walworth roads. Mr. Alfred Bartholomew, in his well-known work on "Practical Architecture," has graphically described and illustrated the weakness, but the rage for new fronts has increased immensely since his day. It is unfortunate that the Building Act of 1855 did not take this very common transformation, created by the efflux of town residents, into account, and provide for it, as it is obvious if this had been done the Dangerous Structures clauses would not have been so necessary as they are now. The Building Act only provides that every bressummer shall have bearings at each end of 4in. at the least, and that, if bearing upon any party wall, templates of stone or iron must be provided; but nothing is prescribed as to the maximum length of unsupported bearing, the scantling of the bressummer itself, or what size of story posts or piers are required. From this uncertainty, no doubt, many errors have been committed. But the case of corner buildings demands even greater precautions. We often see a building supported on a frame of iron or timber, upheld by a single angle stanchion of iron, and by about two other pillars in the frontage. Now these supports may be strong enough, though they do not so satisfy the eye in many instances; but other questions, of which we are left in complete ignorance, relate to the foundations of the story posts, their fixing to the bressummer, and the connection of the latter at the corner. These are points, we are bound to say, for which a Building Act in every town should specially provide. In London they are supposed to come under the jurisdiction of the surveyor, though we have frequently observed very faulty and inadequate fixing of the pillars to the girders, and of the girders themselves at the angle. The usual kind of bressummer in ordinary buildings consists of a balk of timber sawed in two or three, and converted into a flitched beam or trussed. We contend this is inadequate guarantee of strength and efficiency, and that it would be far better to make it compulsory to use beams of concrete and iron, the iron being introduced as tensile bars in the lower half of the section, as we have lately recommended. Such beams would be not only stronger and more reliable than iron beams, but would be fire-proof as well, and would admit of architectural treatment and decoration to a degree not contemplated under the present sham mode of casing up and forming counterfeit entablatures. In corner buildings, too, we should make it imperative to carry up one angle pier of brick and cement, or, if the corner has to be left open for a doorway, to erect side stanchions of iron encased in concrete, with a cross or head-piece to connect them below the beams. We venture to think these suggestions, if carried out, would obviate a very serious defect in our building regulations, and insure that immunity from danger in our commercial towns to which we are imminently exposed if a general conflagration were to break out.

PRECAUTIONS AGAINST STORM OVERFLOWS.

The very heavy rains of the last week have taught the residents of our low-lying localities that ordinarily efficient drainage is not always to be relied upon. From various southern districts of the metropolis we learn that basements have been flooded, while even floors on the ground level have been submerged. The same complaints reach us from Sheffield and many of the midland districts. The inconveniences of these overflows point to a few very simple means of obviating them, which builders, curiously enough, overlook, apart from the capacity of drains and efficient outlets. If we examine into the causes of overflooding, we shall find many defects of omission. One of the greatest is the ease with which water can enter the house. In nine cases out of ten, the levels of the basement are such that water is actually invited—the paved areas fall towards instead of away from the house; the ground has not been laid out with proper currents; if sinks or grated cesspools exist they are placed in positions that do not intercept the main streams, or the pavement is so irregular that little surface water can pass away by them. Then the feet of stack pipes generally pour their contents near some threshold, and no provision is made for sudden rainfalls. To obviate these defects it is necessary, first, to place our yard gulleys in the very lowest part of the adjoining areas or ground, which should have a current away from the house of at least 2in. to 10 feet, and to bring the feet of the rain water pipes as near as possible to them; to avoid all unnecessary bends to the pipes, and to turn the outlets or shoes well away from the wall; to lay the paving nearest the walls and thresholds with a steeper incline than the remaining portion, so as to throw off the water quickly; and lastly, to place as many checks and impediments as we can to the outer doorways, such as steps, weather boards, &c. It must be remembered that the thresholds of doors get worn below the level of the ground, and that water soon finds its way in if not thrown off a sufficient distance by the means of weather boards, &c. Too little attention is paid to these details by architects and builders, and in heavy rainfalls the inmates of houses suffer the consequences. They attribute fault to the drain, whereas, in numerous cases, the mischief arises from the insufficient inclination given to the ground, and from not taking precautions to check the ingress of the surface water to the house. The best sink traps are undoubtedly those with movable lids of stoneware or iron that can be readily cleansed, and the openings should be large enough not to become quickly choked up by silt and rubbish when a heavy rainfall occurs. The common perforated stones are faulty in this respect. Iron box-traps are not so clean as stoneware, of which there are many kinds, such as those manufactured by Doulton, the Buchan gulley-trap, &c. The less space there is for lodgment of solid matter the better. One of the simplest remedies against flooding by excess of rainfall is to store it, and it is strange that provision is not made in modern houses for storing the water. A rain water tank may be sunk about 4ft. or 5ft. in diameter, and 10ft. deep, lined with brick and cement, and would be of considerable use to the tenant of every house, and its cost need not be more than from £5 to £8.

THE TRANSFER OF GAS WORKS TO LOCAL AUTHORITIES.*

Some time ago we noticed a work written by Mr. Arthur Silverthorne, C.E., on this subject. A new and enlarged edition has just been published, in which the author continues the history of the transfers of gas works from 1868 to 1878, and adds a chapter on the London Gas Supply of 1878. From the facts stated by the author there is abundance of evidence to show the economy and advantages accruing from the transfer of gas works to municipal bodies. We have before alluded to the history of gas works and to many towns where the control of the works are vested in the Local Board, Corporation, or Improvement Commissioners. Mr. Silverthorne says, "the number of towns that have already adopted the system of directing their own gas works, does not bear an inconsiderable proportion even to the number of companies incorporated under special Acts of Parliament. The latter reckon at the present moment in England and Wales about two hundred and forty-eight, and it is well to add that the proportion of unincorporated gas companies to the former is in the ratio nearly of four to one." Gas companies without statutory powers are still to be found in important towns in Scotland. In many towns the transfer has been negotiated privately; in other cases, as Sheffield, Nottingham, Ramsgate, &c., the compulsory transfer has been opposed successfully, while in a few large towns—Glasgow, Rotherham, Aberdeen, Stafford, &c.—the compulsory principle has been sanctioned by Parliament. For precedents referring to gas Mr. Silverthorne's work will be found of value. Gas companies, we all know, like to keep the price of gas as high as they can, in order to guard against a rise in the price of coals, and through an omission in the Act of 1847 an excess of profits has been devoted not to give consumers a cheaper supply, but to create new capital for the shareholders. These two facts should be sufficient to induce local authorities to apply for powers if no other reasons existed. The author states that a well-managed gas company is certain to pay 10 per cent., a dividend that compares well with that of other investments; but unfortunately the consumer does not share in the profits at all. It is true Mr. Raikes' recent proposal mends matters a little, and it is now provided that in every bill by which a gas company raises additional capital provision shall be made for the offer of such capital by public auction or tender, at the best price which can be obtained; but still the fact remains that the opposition of a public body on purely philanthropic ground, as the author observes, "instead of being met in a respectful manner is usually characterised by the promoters as an offensive interference with constituted rights, and the legitimate claims of the ratepayers are overruled by the eloquence of the Parliamentary Bar." Again, our author fairly argues no corporation is being fairly dealt with by a gas company which charges at the rate of £4 per lamp per annum for

* The Transfer of the Gas Works to Local Authorities, with Statistics, &c. By Arthur Silverthorne, Consulting Engineer. London: Crosby Lockwood and Co.

public lighting, which charges 5s. per 1,000ft. of gas, when in London it is actually sold for 3s., or which supplies gas below the standard of 16 candles. These are legitimate grievances which entitle any public body to be heard. The means by which corporations or local authorities are empowered to purchase gas works are the Municipal Borough Funds Act, 1872, which sanctions the application of borough funds, to promote bills for the establishment of gas or water works, if not in competition with any existing companies and to promote purchases, and the Public Health Act, 1875, sec. 162, which affords the local authority the privilege of purchasing works "by agreement," provided the area supplied by the company is within the borough district.

The author rebuts the idea that the companies are in a better position to manage gas works than local boards; he observes with truth that a corporation does not incur the repeated expense a company does in applying to Parliament for increased powers and capital, It can purchase coal at an advantage, it can effect a great saving in respect of management, it can reduce the burdens of the petty rates, and can extend the works out of surplus profits, all of which a company cannot do. Again, the demand for gas is doubled every ten years, a constant accession of capital is needed, and a corporation can borrow at 4 instead of 7½ per cent. It can be shown by figures that this advantage is a great annual saving to the consumer. Mr. Silverthorne says it is strange that gas companies should have any objection to part with their works when the offers made are of the most advantageous kind. We know many companies have refused most liberal offers; and on this the author observes "the principle of giving maximum guaranteed dividends to the shareholders of gas companies for the sake of acquiring the works without opposition is a gross miscalculation, and the highest amount the companies are really entitled to claim in that way is the market price of a secured corporation annuity, equal in value to that of the company's stock before any rise in price arising out of the prospective purchase." We are glad to find the author condemning the usual mode of borrowing the purchase-money, and paying off the companies, and that he proposes purchase by means of redeemable annuities, and that borrowing be confined to necessary extensions. Sir Stafford Northcote's recent observations on the too great facilities given to local bodies to borrow at moderate rates, and Mr. Gladstone's reply are printed by the author, and are *apropos*.

The statements of various transfers are of great value to local authorities, as they show great differences in the cost of purchase. The case of Leeds is enough to prove the benefits to be derived by municipal management. The Corporation paid £140 for every £100 of 6 per cent stock, or 23¾ years' purchase, and the results are highly satisfactory. Through the advantageous coal contracts made by the Corporation, a reduction was made for gas in 1877, from 3s. 3d. to 2s. 9d. This is probably the cheapest gas supplied. Limerick has a bill in Parliament to purchase the gas company's works, and already the price of gas has been brought down by the opposition from 15s. to 5s. per 1,000 feet. Here the company and corporation have each had works of their own, and have worked in fierce opposition, the result being that neither paid. In nine out of ten cases enumerated, the consumers have been compelled to take the supply into their own hands, owing to the dissatisfaction with the price and quality of gas supplied. At Stoke-on-Trent the paid-up capital of the gas company is £34,000; it has paid 10 per cent., and an agreement has been come to by the Corporation to pay 25 years' purchase of the dividend; and we could mention many other cases to show the desirability of the purchase, on the grounds alike of economy and efficiency.

Some very interesting particulars are given respecting the London gas supply, which may be aptly compared with large corporation undertakings. Mr. Silverthorne strongly opposes the transfer of the London gas companies to any untried body of representatives, such as that proposed under the "municipality scheme," and considers the control of the gas supply should be confided to a gas commission, selected from the Common Council and the Metropolitan Board of Works, as the only assemblies competent to deal with the gas supply of London. The facts brought forward indicate the great economy that would result from a transfer of the gas companies of the metropolis to local authorities, such as the saving in law and parliamentary costs paid in fighting the metropolitan bodies, and the author believes there is a prospect of an immediate saving of at least £151,620 per annum by the acquisition.

A NEW METHOD OF DETECTING OVERSTRAIN IN IRON.

PROF. R. H. THURSTON, in a paper read before the American Society of Civil Engineers, and printed in the "Transactions" of that society, shows that it is possible to detect in the overstrained members of a broken structure the amount of such overstrain at any later time, and to determine, with a fair degree of certainty, the overload to which an iron bridge has been subjected. Hodgkinson, Clark, and Mallett, French and German investigators, have established the fact of change of form and variation of the elastic limit under gradually increased loads. Prof. Thurston, in America, has devoted much attention to this behaviour of metal under strain, and has discovered that with metal of the iron or tin class, and under the same conditions of manufacture, the rate of elevation of the normal elastic limit by intermittent strain may be expressed by a simple formula. The effect of intermittent strains considerably exceeding the primitive elastic limit has been determined also by Commander Beardslee, U.S.N., by direct experiment in the laboratory of the Stevens' Institute of Technology. The author of the paper says:—"From a study of the results of such researches the writer has found that, with such iron as is here described, the process of exaltation of the normal elastic limit, due to any given degree of strain, usually nearly reaches a maximum in the course of a few days of rest after strain, its progress being rapid at first, and the rate of increase quickly diminishing with time. For good bridge irons the amount of the excess of the exalted limit above the stress at which the load had been previously removed may be expressed approximately by the formula—$E^1 = 5 \log. T + 1{\cdot}50$ per cent., in which T, the time, is given in hours of rest after removal of the tensile stress which produced the noted stretch."

The paper of Professor Thurston further shows that strain diagrams, autographically registered, become the loci of successive limits of elasticity of iron at different positions of "set." An imaginary case is given of a Howe truss or similar bridge, from which it is inferred that the destruction of such a bridge can be explained upon the above principles, and that, in short, very many failures of this kind, "involved in mystery," are to be attributed to a sudden load, capable of straining the metal to about one-half of its ultimate strength if slowly applied, but which has the effect of doubling it. It will thus be learnt from the facts brought before us by the author that a structure of iron may be capable of sustaining the largest load ever likely to come upon it, if that load be applied gradually; but that it may snap in two like a reed if the same load is suddenly brought to bear upon it—a maximum stress, equal to twice that of the gradually applied load, being the effect. The same risk may arise when a railway train or sudden load results in loosening a nut or in breaking some part, by which the load falls a distance, and causes a sudden impact. It would be interesting to know if similar results have been discovered in wooden and other structures. We know quite well that a sudden stampede of cavalry over a bridge tries it far more than the same weight at rest or moving in unmeasured time; that a sudden gust of wind has blown down walls and shafts that have withstood heavier gales; and that a sudden accession of load imperils a building far more than a steady or slowly increasing load. The effect of sudden jar or impact, we are inclined to think, is not usually taken into account in the construction of our pillars and girders, and much that at present remains a "mystery" in building casualties may be explained by the law of the exaltation of the elastic limit we have referred to.

POWER OF RUNNING WATER.

IN a paper by Mr. Clemens Herschel, C.E., of Boston, published in the *Journal* of the Franklin Institute, some interesting experiments on the power of water in moving various substances is given. Allusion is made to a record of experiments made in 1857 by Mr. Thomas E. Blackwell, C.E., Commissioner on Metropolitan Drainage, from which it is inferred, first, that for objects of the same kind, the velocity of stream required to start them, increased with the mass of the object; second, for different objects the velocity increased with the specific gravity; third, that the nearer the object assumed a spherical form the less velocity it took to move it, whereas a flat object like slate required a current of considerable velocity to disturb it; and, fourth, as the velocity of current increases after the object is in motion, the velocity of such object increases in progressive ratio. As a general conclusion a velocity of 2ft. to 3½ft. per second will remove all objects of the nature and size of those likely to be found in sewers. Mr. Herschel, however, says that no relation can be discovered from these experiments between the mass and the velocity, or between specific gravity and velocity, and he points out the want of regularity in the action of currents of this kind. The conclusions of the author are: first, that water in motion tends to act upon its channel by *direct friction*, tending to drag materials along its bed, or down its banks if these have a steep slope, and, by *lifting up* materials, holding them in suspension, and thus carrying them along in the body of current. Direct friction produces shoals, but no expression by formulæ is practicable of the force which abrades banks and beds, and lifts material, and the effects of the inner movement of the particles of water must remain a matter for judgment. Second, for either kind of motion, and for every amount of it, there is a limiting size of individual objects of a certain specific gravity, which will no longer be affected by such motion; therefore, just as soon as the beds and banks of a watercourse are covered with bodies of this size and quality, the smaller and lighter having been washed away, the beds and banks remain permanent. Speaking of remedies for the erosive action of streams and rivers, and the consequent undermining of bridge piers and similar masonry, the author points to that diminishing the velocity and the relative motion of the particles of water; that of making the stream regular and uniform, or of protecting the parts affected from erosion by stone pitching, fascines, &c.

COMPETITIONS.

GREAT YARMOUTH.—We are requested to say that the Town Council of Great Yarmouth cannot return the drawings sent in for the recent municipal buildings competition held here, of "East Coast" and "B with Arrow in a Circle," as the authors have not forwarded their names with the sealed letters that should have accompanied the designs.

The first public park in Wigan was opened on Monday. The town offered prizes for the best design for laying out the park, and after competition Mr. Maclean, of Derby, was awarded first prize, and upon him has devolved the duty of superintending the work. The park is laid out in the Italian style. At the principal entrance there is in course of erection a lodge, in the Swiss style, from the designs of Mr. Fletcher, of London.

On Saturday afternoon the memorial stone of the St. John's Wesleyan chapel, in course of erection in Park View-road, Manningham, was laid. The estimated cost of the new building is £10,000. Seats for 750 persons will be provided on the ground floor, and for 250 in the gallery. The style will be Early English, freely treated. The architect is Mr. C. O. Ellison, F.R.I.B.A., Liverpool. The contract for the works has been let to Messrs. Wm. Ives and Co., Shipley.

New Board Schools at Howdon were opened on Tuesday. They were built by Mr. Robert Harbottle, of Shieldfield, from designs prepared by Mr. John Johnstone, of Newcastle-on-Tyne.

Building Intelligence.

Blackburn.—On Saturday last the new Independent Schools, Audley Range, were formally opened. These schools are one story in height, and contain accommodation for upwards of 600 scholars, which number will be increased to 850 when the whole design has been carried out. The plan contains a large room, 90ft. × 40ft., the height to the square being 16ft., and to the ceiling line 30ft.; four class-rooms, 18ft. × 18ft., and of corresponding height; book closet and front and back porches. The style of architecture is thirteenth century Gothic, simply treated. The outside walling is Yorkshire pierpoints, having a cavity and brick lining; the ashlar dressings to doors, windows, &c., are also of Yorkshire stone. The roof is open timbered, stained and varnished, and slated with blue and red Velinheli slates in band. The contract was let in July last year to Messrs. Thomas Higson and Sons, Blackburn. The work has been carried out (at a cost of about £3,200) under the supervision of Mr. William S. Varley, architect, Blackburn, whose design was selected in a limited competition.

Crewe.—The restoration of Christ Church, Crewe, has just been completed. The church was originally built by the London and North-Western Railway Company in 1845, and was a cruciform brick structure with stone facings in the Anglo-Gothic style of architecture. Since that time it has been twice enlarged, the previous occasion being 14 years ago, when the aisles and gallery were added. The church, which has been re-built for the third time, now contains vestibule, nave, chancel, transept, and gallery, and is a specimen of the Early Pointed style. The improvements, which have been carried out by Messrs. Cubitt and Co., of London, will cost about £5,000, exclusive of the new bells and a new organ. The front is of Granshell freestone and Yorkshire rubble. The Norman tower, the feature of the west front, is 96ft. from base to summit, all of carved Granshell freestone, with the exception of the clock portion, which is of terra-cotta work. Mr. Stansby, architect of the London and North-Western Railway Company, drew the plans. The inside of the church has also been entirely renovated. The west portion, in addition to the vestibule with opened roof and carved corners, has been enlarged to hold 300 additional sitters, and this portion of the church and gallery is entirely new.

Holborn.—The foundation stone of a new board-room and offices for the Holborn District Board of Works was laid on Saturday, the 3rd inst. The building will occupy a site of land at the corner of Liquorpond-street and Gray's-inn-road, having a frontage to the latter street of 100ft., and a return depth next Liquorpond-street of 124ft. The ground-floor story will contain a public office for the conduct of the general business of the board, and immediately adjoining are offices for the clerk, surveyor, and medical officer of health. In the rear of the site on this floor will be found a mortuary, post-mortem room, and disinfecting room. The board-room is approached through a doorway and entrance hall at the corner of the site, leading to the principal staircase which is wholly composed of stone, and is 6ft. wide. With the exception of the entrance to the ratepayers' gallery at the east end of the site the whole of the area on the ground floor, exclusive of the rooms we have named, will be devoted to the purposes of a stoneyard and depôt. On the first floor will be found the board-room, 90ft. long, 45ft. wide, and 30ft. high. There is also a committee-room, 48ft. long × 30ft. wide; as also a sub-committee room, and the usual lavatory and retiring rooms. The façade next Gray's-inn-road is carried up one story higher. The style is Italian, freely treated, a noticeable feature in the composition being a clock tower at the corner of the site, which will rise to a height of 100ft. The materials employed in the elevation will be red brick and Portland stone; the doorway forming the approach to the board-room being composed of polished Aberdeen granite. The works are being carried out from the drawings and under the superintendence of Messrs. Isaacs and Florence, architects, of 3, Verulam-buildings, Gray's-inn, the contract being let to Messrs. Brown and Robinson, for the sum of £25,987.

Manchester.—Last week the new Church of St. Bride, Shrewsbury-street, Brooks's Bar, Manchester, in course of erection for the past 16 months, was consecrated. When finished, the church will consist of nave and aisles, together with north and south transepts and an apsidal choir. The internal dimensions of the nave and aisles are—length, 90ft.; breadth, 52ft.; height from floor to apex of roof, which is open, 56ft. It will, when completed, seat 800 persons. The style of architecture is Geometrical middle pointed. The walls externally are of Yorkshire parpoints, with dressings of red Runcorn stone. The arcade of the nave is in Bath stone, with columns of red Runcorn, and the plain face is plastered. The roofs are of red pine, and the seatings, &c., of Baltic timber. The architects are Messrs. Pennington and Bridgen, of Manchester and London; and the contractor is Mr. Wilson, Hulme.

Newington, near Hull.—The new church of St. John the Baptist, Newington, near Hull, was consecrated last week. The building consists of nave and aisles, and chancel and aisle, the latter being used as an organ-chamber and vestry. The style is Early English of the Transition period, and the exterior of the church is of red brick. The entrances are placed north and south, and small porches are provided for both doors. The edifice has cost nearly £5,000, and the accommodation provided is for 700 adults. Messrs. Simpson and Malone, Hull, have erected the building from the plans of Messrs. Smith and Brodrick, architects, also of Hull.

Oswestry.—A new Welsh Wesleyan chapel has been opened at Oswestry. The building consists of an open porch, with vestibule right and left, leading to nave and aisles. There are two short transepts. The total dimensions of the chapel inside is 62ft. by 40ft., and it is capable of accommodating about 300 people. There is a range of schoolrooms in the rear, 33ft. by 23ft., and a vestry 16ft. by 9ft. The architect was Mr. Richard Davies, of Bangor, and the contractors and builders were Messrs. Morris, Chaplin, and Corney, of Oswestry. The contract was £1,722.

Shanklin.—Gatten Vicarage, Shanklin, Isle of Wight, commenced in the spring, is being erected on a piece of ground near the Shanklin station, adjoining St. Paul's Church. Part of the site was given by the Rev. W. E. Carter, and part has been obtained by Lady Hatherton on long lease, and handed over to the Ecclesiastical Commissioners for the benefit of the living. Her ladyship has been also a very large donor to the building fund. The architect is Mr. C. L. Such, of Carlton Chambers, 12, Regent-street, London. The outside walls and all stone dressings are of local stone of a lightish grey colour. The church, of which only half has been built and opened for divine service, will, when complete, be a handsome structure. The vicar, the Rev. W. Pettett, is appealing for £3,000 to build the other half.

Sheffield.—The new women's hospital, situated in Leavy Greave, one of the best parts of the town, being complete, has just been opened. It has been built at a cost of upwards of £30,000, solely at the expense of Mr. Thomas Jessop, a wealthy merchant, and native of Sheffield. The architect is Mr. J. D. Webster, of 21, Church-street, Sheffield, and a perspective view of the building appeared in this paper some two years ago (Aug. 4, 1876). The style of building is freely-treated Elizabethan. It is built of red brick, with dressings of Hollington stone. There is a bold central tower, with mansard roof, and the gables being numerous, the roofs of steep pitch, and the chimneys well managed, the general sky-line, from every point of view, is happy. There are three frontages. The roofs are covered with grey Welsh slates with red creases. The parapets are of worked and pierced stone. The main entrance is under the central tower. The internal arrangements are excellent, and everything that is necessary has been done to secure the comfort of future patients. Upon the ground floor is the board, waiting, and governor's rooms, and the dispensary; whilst the three stories above are arranged as wards and necessary offices. The broad corridors are laid with Maw's encaustic tiles, and the grand staircase windows have stained glass therein, by Messrs. Powell, of Leeds. The whole of the building is inclosed by an external boundary wall, surmounted by wrought-iron rails. The general contractors were Messrs. Chambers and Sons, of Sheffield; and the warming and ventilating arrangements are by Mr. Phipson, of London. The plumbing was by Mr. Corrie, of Sheffield, and the carving by Mr. Harry Hems, of Exeter. Mr. Kenyon, of Sheffield, was the slater, and Mr. W. Robinson, also of Sheffield, the painter. Mr. Payne was the clerk of works.

Stonyhurst College.—The foundation stone of the west wing of this structure was laid on the first of the month. Prize day having been selected for the event, it was celebrated with much enthusiasm. A full description of the extensive works in course of progress at the college having already appeared in our pages, it is only necessary to add that the present contract has been let to Mr. Craven, of Blackburn, for the sum of £52,000. The architects are Messrs. Dunn and Hansom, of Newcastle-on-Tyne, and the carver's work is being executed by Mr. Roddis, of Birmingham.

West Leake, Nottinghamshire.—The parish church of St. Helena has just been reopened. It has been carefully restored from the designs and under the immediate superintendence of Mr. Henry Hall, F.R.I.B.A., architect, of 19, Doughty-street, Mecklenburgh-square, W.C. Built in the Decorated style, it consists in the main of nave, south aisle, north transept, and chancel. The clerestory and south aisle have been rebuilt, and new roofs have been put up over both nave and aisle. The open turret with two bells is a pleasing feature at the west end. The roofs are of steep pitch, covered with warm red tiles. At the eastern end the ivy still clings in luxurious wantonness over the walls, and grasps prettily the ancient chancel roof. The apexes to the gables are surmounted by foliated crosses in worked stone. The roofs themselves are carried by massive stone corbels, the aisle roof is a lean-to one. They are of pitch pine, so also is the seating in the church generally. The choir stalls are massive, their ends being of 3in. stuff. They are in well-seasoned oak; as also is the pulpit and the two-faced reading desk. All the oak-work is richly moulded and carved. The pulpit stands upon a stone base just outside the north side of the chancel, from which it is ascended by four steps. The chancel rises two steps above the line of the nave floor, and the altar is raised upon two steps more. The doors are all of oak, with pitch-pine internal framing, and the wrought-iron hinges are foliated. The chancel floor, and the avenues, are laid throughout with encaustic tiles, of pleasing design and colour. The glazing generally is of cathedral-tinted glass. The east window glass, however, has a finely-painted picture thereon, representing the Resurrection. It is by Messrs. Heaton, Butler, and Bayne, of London. The transept window is altogether new, and so is the north-west porch. The altar-rail is of oak, upon wrought-iron standards. There is a reredos of eight bays; this is in Caen stone. The columns are of serpentine, and the recessed panels are of alabaster. In the central one is a simple Latin cross, in pure statuary marble. The capitals and higher part of the reredos are carved with foliage of a naturalesque character. Several highly interesting old tombs exist in the church, and other features are preserved, which will be viewed with pleasure by the visitor. The contractor for the whole of the works was Mr. Henry Black, of Barrow-on-Soar, near Loughborough. The wood and stone carving is by Mr. Harry Hems, of Exeter. The cost of the restoration has been defrayed by Lord Belper.

Heating Towns by Steam.—A company has been formed in Auburn, New York, to carry out the project for heating the city by steam on the Holly plan. The people of Toronto are thinking of trying the same scheme. A company, called "The Toronto Steam Combination Company," has been formed, and is applying for incorporation, for the purpose of carrying out the system. The proposed capital stock is £10,000.

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Correspondence.

GOSSIP ON SUNDRIES.

To the Editor of the Building News.

Sir,—Granite, as is well known, has been largely used for building purposes at Chicago, and, after the great fire there, much interest was felt in the accounts that came over to us as to the powers that material possessed for resisting fire. They were, I think, universally admitted at every hand to be *nil*. Not many months ago a good old church in the west country—that of St. Peter's, at Lamerton—was accidentally consumed by the devouring element. This building, like so many of its fellows in Cornwall and the west of Devon, was constructed largely of granite, and now that its rebuilding has just commenced under the superintendence of Mr. James Piers St. Aubyn, the well-known architect, it may be a little profitable to make a remark or two upon the effect the untoward conflagration had upon the materials wherewith the structure was built. The experience obtained at Lamerton appears to be precisely the same as that our American cousins gained at Chicago, and the most cursory inspection of the ruins proves that of all the materials used in the construction of its ancient fabric the weakest, and the one least to be relied upon in case of fire, is undoubtedly granite. The church, like nineteen-twentieths of our western churches, belonged principally to the 15th century—the tower alone, perhaps, being older. It is pleasantly situated amidst delicious hedge-rows and charming green lanes, some 2 or 3 miles from the quiet little market town of Tavistock. Two years ago or so it was thoroughly restored by Mr. St. Aubyn, and the villagers were right proud of their church, until one unlucky night the lamp, placed in the organ to regulate the temperature of that instrument, is supposed to have set fire to the surroundings, and the building was completely gutted. So great was the heat upon that occasion that five out of the half-dozen bells in the tower melted where they hung, and the molten metal ran down, one bell only falling entire. Unlike the church generally, this tower was not built of granite, but of local freestone from quarries a few miles distant. Curious to narrate, the soft stone resisted the action of the fire successfully, though the belfry and other windows in the same tower, being of granite, were burnt completely out. The heat was admittedly greatest about this tower. The massive granite arcades in the church were burnt completely through, and in some instances the material seemed to burst by the action of the fire, and to shoot off some feet from where it originally stood. Formerly some interesting marble monuments adorned the walls of the structure. These were quite consumed, but the plaster of Paris by which they had been fixed resisted the heat, and whilst marble and granite crumbled away and the very tiles upon the floor were burnt through, it remained hard and perfect. All this appears conclusive evidence that granite cannot resist fire. Whether it stands satisfactorily the action of weather is also not altogether certain. Only yesterday I was comparing the north-east window—grey granite—with the western tower doorway—local freestone—at St. James's Church, Iddesleigh, a remote village in North Devon. They both belong to the 15th century, and the old stone doorway is certainly in a much better state of preservation than in the granite jambs and tracery of the eastern window. To use a homely expression, granite seems, after a number of years, to wear very rough.

Good specimens of old font covers are rare in the West of England. Rich as Somerset and Devon are in ornate rood screens, carved waggon roofs, and curiously chiselled bench ends, it is very seldom that one comes across a thoroughly good example of an ancient font cover. The best I know is a charming Perpendicular one at St. Margaret's Church, Pilton, about a mile from Barnstaple, but there is one of singularly unique construction, and of much greater interest, now lying in the loft of a cow-shed pertaining to a farm-house in the out-of-the-way hamlet of Shaugh Prior, upon the western borders of Dartmoor. The church, dedicated to St. Edward, was restored twelve or thirteen years ago from the designs of Mr. Alfred Norman, architect, and several times Mayor of Devonport, the builders being Messrs. Call and Pettick, of Plymouth. According to the farmers' version, this cover was bundled out of the church during the time the works were in progress, and ever since, amidst oats and chaff and straw, it lay uncared for and forgotten in the "linhay" (Devonshire for stable) until the new vicar—the Rev. J. B. Strother—and I unearthed it recently. Taking as a plan the octagonal form of the particularly plain moor-stone font it for so many years stood upon, it is 2ft. 6in. in diameter, and is upwards of 8ft. high. Its detail is Perpendicular, and the general form spiral. It rises 2ft. 9in., first of all without a break—then the diameter lessens, and it again runs up perpendicularly another 2ft. The cants on the sides are richly carved, and the angles terminate in pinnacles surmounted in each instance by small carved figures. Higher up, the cover assumes the form of a spire, the eight faces being well carved with puried and flowing ornament. The whole is crowned by the figure of a bishop (minus his head, which defect, by-the-bye, applies to all the other figures) in full canonicals. The little statue is about a foot high, and, it may be interesting to mention, is robed in alb, cope, and chasuble. This font cover always remained *in situ*. It was never removed or raised when the sacrament of holy baptism took place. In this I think it is singular; certainly it is so hereabouts. The font stood close against the north side of the most western column of the old granite southern arcade. Moving upon hinges the lower part of the cover opened, and, very like a tryptic, two cants on either side turned back upon the neighbouring column. Hence the cover formed a noble baldacchino, as it were, over the font, and under this stationary canopy the infant was sprinkled. It would be interesting to know if other fonts exist in this country of like construction. If they do, I hope they are not as the one at Shaugh Prior is at this present moment—rotting in a barn.

When we see beautiful old fragments of ancient detail, up and down, in out-of-the-way places, we are often constrained to "take a squeeze" of them, and cast the same in plaster for after reference. Of course, every one knows how to knead up modelling clay, and take an impression therewith, but everybody knows too that pipeclay leaves a dreadfully ugly mark behind, a messy smear that gets worse instead of better, and can only be removed after a deal of trouble. The proper thing to take impressions of old woodwork with is "squeezing wax." There seems to be a great want of knowledge generally as to how this material is made, and although receipts for its production have been given more than once in this journal, the question is renewed, and a recent number of the Building News contained a query asking for information thereon. It may be made in this way—Melt slowly together over a fire 18oz. of beeswax, 24oz. of lard, and 6oz. of olive oil. Then take 10lb. of whiting, pound them well up, and when the mixture formed by the three former ingredients is cold mix all together with the hands. Personally, however, I prefer to take a pound of beeswax, a like quantity of lard, four pounds of flour, and a pint of linseed oil, and melt them together in a crock over a slow fire. Folks complain that sometimes the wax is sticky, and is not sufficiently plastic and tough. To obviate this, and to give proper elasticity, add to the mass at any time a little fine flour, rolling it therein, and then well kneading the flour dust and wax together. This will readily remedy the difficulty, and may be repeated if necessary. The wax will last for years.

We have, all of us, read with great interest, and no little instruction and profit, Mr. Blashill's recent exhaustive paper upon the difference between oak and chesnut. I have just completed a large and elaborate mantelpiece in the latter material, and am pleased to bear testimony that whilst thoroughly seasoned chesnut may be bought and worked cheaper than oak, it certainly looks so much like it that out of a score of architects who have seen the mantel in question only one has recognised the material of which it is made.—I am, &c.,

Harry Hems.

THE NEW ORATORY, BROMPTON.

Sir,—The salutary cautions which, from time to time, have been addressed to the architectural public in the professional journals on the subject of competitions have evidently not had the desired effect that might have been expected in preventing architects from rushing in to try their fortune on unknown ground. Neither have these articles appeared to open the eyes of promoters of competitions to the wilful or ignorant injustice which they continually inflict on the profession by baiting them with the guarantee of a competent referee being appointed, and afterwards giving their votes to the man of their own choosing.

The correspondence which has taken place on the competition for the new oratory at Brompton only serves to show that the reverend fathers ride the same high horse with the British public, shouting to a patient and sorely-tried profession, "We know best what suits ourselves." That correspondence has been chiefly confined to a humble request to have Mr. Waterhouse's report published, and the unwillingness of the fathers to accede to that request has created a strong suspicion that their decision is not in harmony with the referee's counsel, and perhaps it is not divulging any secret to say that many of them had a strong preference for the designs specially recommended by the referee, but which were thrown out on the final vote. It is true that they excuse themselves for non-publication of the report on the ground that it was marked "confidential," but the confidence which competitors placed in them in responding so heartily to their invitation is surely a sufficient reason why that confidence should be reciprocated. And in a

very valuable way could the fathers do so by furnishing competitors with the benefit of the referee's remarks. It is very improbable that Mr. Waterhouse would object, and the excuse offered therefore falls to the ground.

The profession, however, cannot but be alive to the fact (as I think has already been pointed out) that the fathers neither bound themselves to accept the referee's decision nor agreed to publish his report, and so far they are within their *legal* right. But I think it may very pertinently be asked of them what their object was in stating to the profession that a referee would be consulted. Was it not a *moral* guarantee that the competition would be decided on a fair and unbiassed basis? If we may judge from the conversation of intending competitors at the time, there can be no doubt that that was the inference drawn by them—an inference which was at once honourable and logical. It is a well-known fact that many architects, both belonging to the church and outside of it, entered heartily (and, let me add, creditably to themselves, as the designs we have seen show) into the competition, with the *moral* certainty that the best design would receive the prize. We know now how that belief has been dispelled, and why, we ask, should the fathers turn a sweet beginning into a bitter end? Do they screen themselves behind a *legal* in preference to a *moral* right? If not, have we not a just claim to ask where they are right and we are wrong.

I will just shortly allude to Mr. Clutton's refusal of the second premium. Mr. Clutton does not volunteer his reasons for that refusal, but I think we may infer that he saw the decision was biassed to men and not merit, and he (to his honour be it said) would prefer to wash his hands of such uncleanness. Are the fathers, then, £75 in pocket through their twisted justice?

One could excuse a town council or vestry board not showing the highest moral example—even among them we find honourable precedents, as, for instance, Wakefield and Barrow, where the referee's decision was accepted and acted upon without question—but when we find high dignitaries of the Church (however actuated they may be by pure motives) asking a profession for designs, and giving moral guarantees that the best would reap the reward, and not abiding by these guarantees, it blows a sickening chill on all sacrifice and honest effort. It is casting no slur on the knowledge of the fathers to say that they cannot, in the very nature of things, be deep experts in judging of the beauties or defects of architectural design, and relying on their own opinion in making a choice is not only an injury to themselves, but an injury to the public, who are equally interested in seeing the best design erected that could be got; and so long, therefore, as the decision remains where it is, so long will the public and the architectural profession be able justly to say "they have not done what they could."—I am, &c., A Lover of Equity.

Paris, July 30th, 1878.

ON SKETCHING.

Sir,—It has often occurred to me that additional facilities might easily be obtained for the study of old buildings of interest.

Possibly, I am particularly unfortunate, but some experiences of mine when out sketch-hunting have been anything but pleasant. Once, in Exeter Cathedral, I was forbidden to draw without the permission of somebody in authority, and as I was there only for a few hours, that was an entire veto. On another occasion, in Southwell, I had the option either to leave the Minster or be locked in while the verger went to refresh the inner man. And more lately, having a day to spare, I did thirty miles' rail, and walked eight, but was unable to get permission to see (the exterior only) Wollaton Hall, the steward being away, and nobody else liking to take the responsibility.

Very often the sexton of country churches has, he says, received express commands not to allow any person to see the church unless he goes with them.

And this suggests another annoyance: when one makes a point of going into every church, he sees the drain of "tips" is not inconsiderable to a slender purse; so a heavy tax is thus put on one of the necessary means of improvement.

My idea is that, if the Institute were to give a sort of certificate that Mr. So-and-so is engaged in the study of architecture, and asking that facilities for study might be given him, I think that after a time it would be recognised by deans and chapters, clergy, and the custodians of buildings generally, so that any one producing such recommendation might have some of the necessary customary restrictions remitted. I believe, also, that very few private owners would resist the "Royal Institute of British Architects."

If some better idea is elicited by this, my purpose will be effected.—I am, &c.,

Derby, Aug. 5th, 1878. W. R. Lethaby.

ST. HELEN'S, BISHOPSGATE.

Sir,—Some time since you were kind enough to insert a communication we made through your columns of the discovery of the old west-end doorway leading to the Nuns' Choir in St. Helen's Church, which after having been concealed with bricks and cement for upwards of 130 years, had again been brought to light. You will regret to hear that there is some danger of its being closed up again unless some substantial interest is taken in its preservation. The churchwardens, the vestry, and parish are most anxious to restore in a substantial and suitable manner the whole of the external work, and in times when church restoration is much questioned, an enumeration of what has already been done will attest that it has been carried out in a careful and discriminating manner; but the necessary and substantial reform is so great that special appeal only remains to be made to those interested in ecclesiology for the preservation of the above.—We are, &c., Wadmore and Baker.

LEGAL INTELLIGENCE.

Relations between Contractors and Sub-Contractors.—Jones *v.* Hughes.—This action was tried at the Liverpool Assizes on Friday last, before Mr. Justice Lopes. The facts of the case, as stated in evidence, were as follows:—Robert Jones, of Knowsley Works, Manchester, plaintiff, sued Edward Hughes, builder, of Liverpool, for £33, balance of contract for iron railing supplied and fixed as an inclosure to a church at St. Helen's, to drawings and under the superintendence of Messrs. Pugin, the architects. The contract sum was £53, on account of which £20 was paid to the plaintiff some weeks before he commenced the work; on his stating to the defendant he was hard pressed to find wages, and that the railing was ready for delivery. Subsequently some ill-feeling arose in consequence of the non-delivery of the ironwork by the plaintiff after frequent application by the defendant. About the first of June last the fixing was commenced by plaintiff, and completed, as alleged by the plaintiff, on the 5th of June. Two days after—viz., 7th June—the plaintiff presented his bill to the defendant and claimed payment. Defendant thereupon refused to pay the balance of £33 until he had an opportunity of visiting the work to see and approve of it, or to obtain the architect's approval, which he promised to do in a reasonable time, and as soon as possible. Plaintiff refused to wait for the balance, and, within a few hours after, his solicitor made application for payment. Defendant explained the transaction to plaintiff's solicitor, Mr. Gaunt, of Manchester, but to no purpose, a writ being issued on the 15th of June, just ten days after the work was done. Neither the architect nor the contractor had seen the work, no certificate was issued, and no money paid on account to the contractor, the defendant, who relied for his defence on the universal, reasonable, and notorious custom existing in the building trade between contractors and sub-contractors, that all work done by the latter shall be subject to the approval of the architect who had furnished the detail drawings, and for such approval a reasonable time must be allowed for his making the necessary inspection. In this case defendant paid the money into court, and defended the action on the ground that it was premature. The jury, however, returned a verdict for the plaintiff. The learned judge hesitated before certifying for costs. His lordship remarked that the action was a stupid one, that it was very desirable it should be known that those actions brought for costs, if there were such actions, could not be successful, because the costs were in the hands of the judge, and there might be a verdict for the plaintiff and costs might be given to the defendant.—This decision makes it necessary for contractors to make special contracts with sub-contractors in all cases if they would avoid the annoyance of being dragged into court within ten days of work being done, and before they have had any opportunity of seeing it.

Intercommunication.

QUESTIONS.

[5466.]—**Staining New Oak Work.**—I happened to be at the new cathedral church of St. Finn Barre's, at Cork, a few days ago. The stalls in the choir have been placed *in situ*, and so have the lower portions of the throne. They are in oak, and are at once beautiful examples of that material and admirable specimens of good joinery. Workmen are at the present moment employed in staining all this woodwork a reddish cedar-like colour. It would be interesting to know why this somewhat unusual course is being adopted, as, so far as I am aware, there is no instance in which oak fittings in an ancient or modern cathedral have been subject to so exceptional a process. It is pleasant to add that as samples of recent English joinery these stalls at Cork and those in the choir at Christ Church, Dublin, exhibit the best workmanship I have met with anywhere for some time.—Harry Hems.

[5467.]—**Slating Battens.**—I have been told that slating laid on boards is more liable to damage than that fixed to battens, and that when boarding is used battens should be fixed along over the boarding. (1) Is this so? (2) And if so, should not the battening be blocked up slightly, so as to leave a small space between it and the boarding to allow to run away any water which might drift or condense under the slating? (3) If felt is used on a boarded and battened roof should it be over the battens or between the battens and the boarding? (4) Is there any objection to the use of cut laths as distinguished from split laths for plain tiling? The former is generally used for pan-tiling, the latter for plain tiling. Why?—Q.

[5468.]—**Mont Cenis.**—Mr. Hems in his interesting reply (5380, Paris and its Exhibition) mentions casually that he has trudged over Mont Cenis on foot. Will he very kindly inform your readers what sort of a road it is that crosses that mountain? Is it not one of the military ones made by the great Napoleon? If so, what relative position does it occupy to our own similar roads at home?—Yorkshire.

[5469.]—**Mr. Parker's System of Ventilating Sewers.**—At page 96 of your columns I read that Mr. Parker's plan for ventilating sewers consists in forcing fresh air into the sewer and drains by means of an inlet cowl, which fresh air, it is stated, renders the sewage gas "innocuous before it escapes at the outlets of the rain-water pipes or untrapped sinks." Now, I should like to ask if it is really intended to allow the sewer gas, even although diluted with fresh air, to find its exit at "untrapped sinks?" If so, I consider the plan both unscientific and dangerous. In some cases the fresh air may be able to render the sewer gas "innocuous;" in other cases it will not be able. A good deal will depend upon the state of the sewer, the wind, and weather, and also the position of the "untrapped sinks," as well as the state of health or strength of the individuals who come under the influence of this diluted sewer air. If the report I read is correct, and Sir Joseph Bazalgette really has stated his approval of the system, I take the liberty—based upon my own experience—to consider that he has made a grave mistake.—W. P. Buchan.

[5470.]—**Synagogue at Cologne.**—Could any of your readers inform me whether a photograph or engraving has been published of the interior and exterior of the synagogue at Cologne; also if there is any work extant on synagogue building and designing?—An Australian Subscriber.

[5471.]—**Ventilation and Hollow Walls.**—A few practical hints about drawing off foul air and admitting fresh air into rooms through hollow walls would oblige—A Reader.

REPLIES.

[5333.]—**Spires and Lanterns.**—Parker's "Introduction to the Study of Gothic Architecture" says:—The central towers "were intended to be, and doubtless originally were, covered by low pyramidal roofs, resembling in appearance those which we find in some parts of Normandy of the same period, there executed in stone." Early Norman turrets are rarely to be met with, and have generally lost the original roof or capping. Instances in which they are carried above the parapet and terminate in pinnacles are to be found at Bishop's Clewe and Bredon, Worcestershire. The Rev. G. A. Poole, in his "Ecclesiastical Architecture," says:—"The roofs externally were all of high pitch, those of the towers but little more so than the rest; and they were covered generally with tiles or shingles, but sometimes with lead. The nearest approaches to spire (in form if not in height) were found in the pinnacles surmounting angle-buttresses in the large churches" (*e.g.*, at the East end of Peterborough).—C. P. Edwards.

[5442.]—**St. Magnus' Cathedral, Kirkwall.**—This building has been very fully illustrated by Sir Henry Dryden, Bart., in a series of measured drawings published by the Architectural Institute of Scotland for the years 1868-1871.—Thomas Ross.

[5445.]—**Sketching.**—This is a vague question. "Student" must first decide his object in sketching, as his drawing must be of a more careful kind if he

wants to carry away detail for future use than if he wants merely a reminiscence of the buildings or something pretty to show his friends. Let "Student" be not too ambitious at beginning. Select a subject of few parts, put in the outline with a loose but light hand, and don't be afraid of putting a few lines on the paper. Correct the outline and sketch in more important divisions. Rub out pencil lines until they are only just visible, and line in with steady and firm hand and an HB pencil. Minor divisions and details, such as joint lines, dentils, and egg and tongue mouldings (in classic work), &c., need not be put in in first rough sketch; but before putting them mark their positions and limits with small dots, and then draw in at once. When the outline is completed don't put any more shading into your drawing than is necessary to exhibit the form or surface, and if time is limited bestow your labour upon a valuable detail, such as a capital, a wall diaper, a pinnacle, and leave all the rest sketchy and merely suggestive. A good preparation for sketching from existing work would be to copy carefully in method, rather than in touch, drawings similarly made by such men as F. C. Deshon, E. W. Godwin (especially the volume for 1874), &c., and which have been published in the BUILDING NEWS. Let me advise "Student" not to fritter away his time in making wall surfaces, sky and foreground, look pretty; all that will come in time.—C. P. EDWARDS.

[5446.]—**Fire-Resisting Stone for Staircases.**—Many fire-resisting stones are known in the trade, of which, as suitable for staircases, I may mention the liver rock from the Craigleith, West Plean, and Corschill quarries; also the thick low non-laminated beds of the Brunton, Minera, Ruabon, Darley, Swales Newton, Haysbaw Moor, Finsdale, Oldarme, and Spinkwell quarries. Others might be enumerated, but above will suffice. If the object of the querist is to obtain a fire-resisting staircase simply, any of the foregoing will suit his purpose, provided he selects them free from lamina or bituminous matter, as in many of the quarries mentioned beds of stone occasionally occur containing bituminous and other deleterious matter, rendering it necessary, so as to insure a perfectly fire-resisting material, that it should be carefully and intelligently selected.—SAMUEL TRICKETT.

[5461.] — **Stamped Agreements.** — It is not necessary to stamp the plans when the contract is stamped. The plan I have usually adopted is to refer to the plans as part of the contract, and to enumerate them by letter or number; also to write on each drawing a note referring to the contract or agreement.—G. H.

[5462.]—**Copying Mouldings.**—"A Manual of Gothic Mouldings" (by F. A. Paley, M.A.), has a chapter on the way "of copying mouldings." 1. The best way is by inserting the paper in a loose joint, and tracing the outline. This, however, is only available in ruined buildings. 2. The leaden tape: A thin ribbon of this metal, about a yard in length, by being manipulated and impressed upon the mouldings, obtains their exact shape. Carefully remove, place upon the paper, and trace. In deeply undercut mouldings merely carry the tape across necks of hollows, and measure depth and breadth. In ruined buildings the tape may be manipulated into a portion of a moulding which is entire, and afterwards drawn upwards or downwards till it finds an exit at a broken place. 3. After mentioning the cymagraph, the author says:—(4) Another, and for ordinary purposes, much the best and simplest way, is to copy by the eye alone, adding the measurements of each face. If the particular measurements of each member are required, they should be given in respect of a horizontal and a vertical plane. Notice carefully whether the bowtells and fillets coincide with either the wall, soffit, or chamfer planes. Several diagrams are given in Paley's book, which leave nothing but practice necessary to enable a person to copy mouldings with ease and exactitude. An answer to a similar question was given at p. 306 of last volume.—C. P. EDWARDS.

[5463.] — **Light.** — If A's light has been so diminished that he is inconvenienced therefrom, he has a remedy at law, and can restrain B from building too high. A, however, must prove obstruction of light to which he has been entitled for 20 years.—SURVEYOR.

[5465.]—**Construction of Roof.**—Much depends on the style of building; but the strongest and probably the cheapest roof for a room 20ft. span is one framed with principals and cross-braces, the latter starting from the feet of principals, and strapped or bolted at the ends. Another form of roof, when the walls are thick, is a collar roof, with upright or wall struts; but the principals should be thick—about 9in. at the bottom.—G. H. G.

[5458.]—**Waterproof Covering.**—I should advise "Jink" to lay a thin layer of concrete over the flags, or to cover the same with a 1in. coating of asphalte. Cement might be used instead, but it is apt to peel off, and would not make so watertight a covering.—ARCHITECTUS.

The parish church of Granston, Pembrokeshire, was re-opened on the 4th ult., after restoration (which almost amounted to a rebuilding) from the plans, and under the superintendence, of Mr. E. H. Lingen Barker, of London, Hereford, and Tenby. The contractors for the work were Messrs. S. and J. Lloyd, of Dark-street, Haverfordwest.

Our Office Table.

WE should like to know whose duty it is to look after that unique structure by Inigo Jones, known as Buckingham Gate, at the bottom of Buckingham-street? It has been supposed to be under the care of the Metropolitan Board of Works, into whose newly laid-out grounds, facing the Embankment, it projects. No one, however, seems to take any pride in it—neither the tenants of the houses, who have the right of access, nor the Board—and the consequence is that the gateway is half filled up with rubbish. Viewed from the gardens it looks very much like a neglected dust-bin. The bases of the columns are buried, and one can only see the upper part of the gate. If the gate is worth preservation it should certainly be kept in decent order, and the old broken iron railing mended on the garden side. A motion on the subject is, we believe, to be brought before the Metropolitan Board of Works to-day, and it is to be hoped the present unsatisfactory state of things will be put an end to. By the way, we notice that the keystone of the centre arch has dropped several inches, and a vertical fracture occurs right through the pediment.

SINCE Tuesday afternoon, when the obelisk was fairly poised on its true centre, it has been raised 3ft., certain matters which it had been proposed to attend to before lifting it further having been postponed for a short time. Meanwhile, the ingenious artisans from the South Kensington Museum have been busily carrying out Major Festing's instructions with a view to making a full-sized plaster cast of the monument for the national collection. Mr. Bullen, who was sent out by the Museum to India eight years ago to take a similar cast of the famous Sanchi Tope gateway, is in charge of the operations. Already several scores of moulds have been secured. The whole of them are in plaster, all thought of taking them in gelatine having been very soon abandoned on account of the heat of the weather, which caused the moulds made in that material to take an unconscionable time in setting. For the present, operations have been confined to the pyramidion and the portion of the shaft above the iron sheathing or jacket. The waist, and the section of the obelisk below the jacket, will be left to be dealt with after the inauguration.

THE new bridge which has been erected over the Regent's Canal at the north-east corner of Regent's-park, opposite Gloucester-gate, and near the York and Albany, was opened on Saturday by the Duke of Cambridge. It is of iron, and has upon the four chief pedestals, massive wrought lamp standards of real bronze. The standards are all but concealed by a profusion of leaves and blossom modelled in cast and wrought bronze from acanthus and lily. At each angle are acanthus "vines," with fluted stems and long cleft leaves, which clasp the springing of the globular lamps. Upon the bridge is a fountain, cast in bronze, from a design by the late Joseph Durham, A.R.A. The subject, "Sunshine," is a young English peasant girl gazing on a distant object with hand uplifted to shield her eyes from glare, while her pitcher is filling at the spring. The bridge has been designed by, and the accessories produced under the superintendence of, Mr. W. Booth-Scott, engineer to the parish of St. Pancras.

WATERLOO-BRIDGE will shortly be open to the public. The Strand is already dangerously overcrowded at the point where the bridge traffic converges; but the present perils and inconveniences will be increased tenfold so soon as the tolls are abolished. A correspondent of the *Times* repeats a suggestion which we made long ago, that at a comparatively small cost a semi-circus could be constructed on the south side of the Strand, and an outlet provided from the south-west corner of Wellington-street through the new and unfinished street in the Savoy on to the Embankment. The property touched by this vast improvement is of small value and is partially occupied, while most of the vacant land needed for the purpose has been quite unappropriated for many years and is now to let. The Embankment is still unprovided with any access to the Strand for half a mile between Villiers-street and Surry-street. This new approach would offer an available avenue about midway between these two widely-separated accesses, and would effect a much-needed improvement.

FROM the Science and Art Department of the Committee of Council on Education, South Kensington, we have received the following list of candidates successful in the competition for the Whitworth Scholarships, 1878:—Thomas Mather, 21, pattern maker, theoretical, 1,112 marks; practical, 662; total, 1,774. William Groves, 20, mechanical engineer, Crewe, theoretical, 976; practical, 780; total, 1,756. William H. Tozer, 21, engine fitter, Exeter, theoretical, 803; practical, 950; total, 1,753. Zachary H. Kingdon, 21, mechanical engineer, Manchester, theoretical, 961; practical, 751; total, 1,702. Thomas Duckworth, 21, marine engineer, Liverpool, theoretical, 1,372; practical, 269; total, 1,641. Joseph E. Needham, 21, pattern maker, Oldham, theoretical, 1,292; practical, 101; total, 1,393. Mr. Duckworth is the son of the late Robert Duckworth, architect, of Liverpool, and is employed in the office of Messrs. Cook and Mylchreest, marine engineers, architects, and surveyors, of the same town. Mr. D. A. Quiggin, son of the surveyor at Liverpool to the Board of Trade, and employed in the office of Laird Brothers, has taken prizes of £40 for extra work, and a royal exhibition of £50.

MESSRS. JONES AND WILLIS have just introduced a new paraffin lamp called the "Triplex," or "Hesperus Star," which is the most powerful we have seen. It has three wicks arranged in a triangular form, and while the light it gives is equal to that of 45 sperm candles it only burns a pint of oil in five hours, being less in proportion to the amount of light than is consumed by any other lamp we know of. Architects and others, who have had to introduce paraffin lamps in country churches and other buildings where gas could not be used, will at once appreciate the advantages of a burner which will enable them to dispense with half the usual number of fittings. Four of the triplex lamps will give nearly as much light as eight duplex lamps—thus only a four-armed pendant is required instead of one with eight arms, and the trouble of trimming and filling four lamps is saved. For domestic use as a table lamp the "Triplex" will certainly find favour. The heat given off only increases the surrounding temperature 1° per hour; this fact was proved by an experiment conducted in July, when the shade temperature was 75°.

CHIPS.

A new dock at Newport was opened on Wednesday. The new dry dock is one of the largest in the Bristol Channel. The depth of water over the keel-box will attain a maximum of 20ft., the minimum being 18ft. The entrance is 50ft wide, while the dock itself is some 56ft. in width at the base, and 74ft. at the top. It has been constructed by Mr. Jas. Abernethy, C.E., assisted by Mr. Walsh, C.E.

Brampton Church, Huntingdon, was re-opened on the 25th ult., after restoration at a cost of £2,500.

It is said that some specimens of painting on tile, which have been sent to the Dean and Chapter of St. Paul's by competitors for the decoration of the dome, have caused a little hesitation in the minds of that body concerning their intention of adorning the structure with mosaic.

The Society of Engineers will visit the New Law Courts and the engineering works of Messrs. Pontifex and Wood, in Shoe-lane, and of Messrs. S. Owens and Co., in Whitefriars-street, on Tuesday next.

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THE BUILDING NEWS.

LONDON, FRIDAY, AUGUST 16, 1878.

NATIONAL COMPETITION DRAWINGS AT SOUTH KENSINGTON.

THIS year an unusual number of good drawings are on view at the South Kensington Galleries; some of great merit, while the larger portion of them display considerable care in execution. Bloomsbury, Westminster, the City and Spitalfields, Lambeth, Kensington, and West London Schools are represented creditably in the prize list, while from the provinces, Birmingham, Bradford, Nottingham, Manchester, Edinburgh, Glasgow, Lincoln, Sheffield, Stoke-on-Trent, Dublin, Belfast, Brighton, Halifax, and Lincoln figure conspicuously. In the oil-colour subjects, which we may take first, Brighton, Edinburgh, and Birmingham carry off the leading prizes, though there are many contributions from other towns that follow closely in artistic qualities. Last year the gold medals in this branch fell to Lincoln and Portsmouth; this time Brighton wins a gold medal, awarded to Elizabeth Grace, to whom also falls the Princess of Wales scholarship. The group in oils is simple in arrangement, and the merit is undoubtedly a material one in nearly all these exhibitions. Well-arranged groups are certainly the exception, and, as we have said before, if the teachers of our art schools were to pay more attention to outline and composition, we should have still better results. Miss Grace's group consists of a plate of grapes loosely thrown upon a plate, a bright green vase and a bronze jug, set off by a light background—a bas-relief with Assyrian figures. The vase and ewer are happily placed one before the other, and the eye rests upon the fruit and the dark rich green vase as the main points of interest, the drapery and coloured matting uniting the whole well together. G. M. Winkles, of Birmingham, gains a silver medal for a richly carved goblet boldly drawn, though less happily grouped, and Mr. Nathl. H. T. Baird, Edinburgh, for a pleasing group. Bronze medals are awarded to A. M. Clarke, of Birmingham, and to Henry Borrows, of Newcastle-on-Tyne, for groups, the latter's being well arranged. There are many other oil groups in this class that strike us, and we make mention of a few that seem to contest in points of art-value the prize designs. A group with a pheasant, a jar, and some holly, by Charlotte Corbett, Worcester; a geranium in pot, from the City and Spitalfields; a fruit piece, by Florence S. Heather, Manchester; groups by Catherine M. Wood, Bloomsbury; Mrs. Brook, Lincoln (bronze medal); Anne Hastling, Manchester; Mary W. Moore, Preston; Mary E. Fraser, Kensington; Marian Reeves, Birkenhead; and Ann Baker, are all creditable performances in respect of composition, vigorous handling, solidity, and good colour. Ellen M. Stanley, Birmingham, takes a bronze medal for a pleasing oil group. It will be noticed from this list that the lady artists have distinguished themselves this year in the oil subjects, and we may observe, generally, a larger proportion of good works from female students than we have seen of late years. One of these oil groups strikes us for the pleasing blending of colour of the objects, two oranges on a blue china plate, with a green jar at the side, and the artist (Mrs. Brook, Lincoln), it appears to us, ought to have taken a silver instead of a bronze medal. Bronze medals have also been awarded to Geo. Bathgate, Edinburgh, G. M. Heaton, Leicester, and Ellen Levett, Ipswich.

Turning to the water-colour groups, Margaret Haseler, Birmingham, wins a silver medal. The subject, red earthenware jars and shell, a good group in colour, though it is hardly so good in outline and colour as another by Thomas Alison, Edinburgh, which goes unrewarded. Arthur E. Moffat, Edinburgh, also carries away a silver medal in this class. Bronze medals have been distributed to Emma H. Barnett, Birkenhead; John Gamon, Sunderland; Annie Hastling, Manchester; and Kate M. Whitley, Leicester. Among the water-colour sketches we notice two pleasing landscapes—one of St. Cross and the other St. Catherine's Hill, near Winchester—by M'Fadden, Southampton, to which no prize is rewarded. For examples of good grouping and colour the subjects by Marian Reeves, of Birkenhead, and Oliver Baker, Birmingham, are noticeable. The oak staircase by the last named is cleverly drawn in oil. In this category we must mention some excellent copies from nature. Flower painting is well represented. We note Miss McLeod's (Manchester R. I.) charming renderings, which have been awarded a silver medal.

Taking the architectural subjects next, we notice many very excellent studies in points of execution, detail and facility of expression, though in nearly all of them the fundamental principles of good design are absent. Ostentatious display of power of manipulation and florid style are abundant in nearly every work of this class of study. The gold medal this year has been awarded to Mr. James A. Stamp, of Nottingham, for a design for a memorial church. The composition has many good features; the treatment of tower and spire is pleasing in proportion and outline; the octagon stage, with its buttress angles, is a clever transition between the two, though not original; but the planning of the chancel and choir is defective. The perspective drawing in line is wanting in precision, and the elevations are by far the best. Samuel P. Pick, Leicester, takes the silver medal for a similar subject. The drawings are in ink line and shaded, and display some considerable knowledge of style. The gable front and the octagon-terminated tower exhibit many good points of detail, though the lantern looks rather stumpy. The detail is well drawn. We note another design by F. Ball, Nottingham, and another by J. T. Henson, of the same town, showing a gabled aisle and a central tower and spire, with arched buttresses springing from the eight angles of octagon—a curious and by no means pleasing feature. The design has the fault of being too florid, but the drawings are commendable. A design for a country mansion, by G. Ransome, of South Kensington, is a neatly shaded India-ink design in French Renaissance, worthy of a medal. The elevations are carefully drawn and shaded, but the design cannot be called an original treatment. A design for School of Art and Science Buildings, by A. Marshall, Notts, has deservedly won a bronze medal. The drawings in ink line exhibit a German Gothic style. The building is symmetrically arranged in front elevation, with a lofty central tower, but the plan is not economical, though it displays ability. South Kensington contributes some good drawings. An honorary silver medal has been awarded to D. Anderson for a country residence, in which a half-timbered and red brick treatment in an old English Gothic style is adopted. The detail displays a knowledge of style. Henry Farncombe receives a bronze medal for a cleverly drawn series of elevations in a similar style, good in detail, but with heavy chimney tops. Mr. W. P. Watson also receives a like honorarium for well-drawn elevations, but too broken with gables in front. We note another design by G. W. Harley (book prize), but it is evident all the students have followed the same instructions, and the plans are the least satisfactory part of the work. A gold medal (honorary award) has been bestowed upon R. H. A. Willis for a drawing of interior of St. Stephen's, Walbrook, from measurement, and we notice one or two others among the honorary awards. We find one or two clever ink drawings from a correspondent of the BUILDING NEWS. Thus, "J'Espere," a well-known contributor to our "Building News Designing Club," sends his designs for an "Oriel," a "Street frontage with mezzanine," a "Country house porch," and wall paper and dining-room decoration, some of which have been published in our pages.

In decorative design we find a large number of good works. Thus, designs to fill spaces in colour display some clever combinations of tint. We note the works specially of J. Butler, H. Oakley, Thomas Smedley, H. H. Hitching, and M. Ramsden, all of Nottingham, who have received book prizes. Nottingham this year, as on previous occasions, stands very high in decorative design. For tile designs Walter Dunn, Westminster, Hyde-place, carries a silver medal for some clever tile patterns of conventional foliage arranged on a hexagonal basis. The colours are pleasing and low-toned. A bronze medal has also been given for a Roman tesselated pavement found near Old Jewry Wall, Leicester. A majolica moulded panel, by F. Marriott, Coalbrookdale, wins a silver medal, and we pass some others of merit. Wall papers and decoration as usual receive a large amount of study. Thus there are some excellent designs contributed by Caroline Armstrong, of Kensington, for the side of a room; the design, Italian Renaissance in style, is refined and harmonious in colour of light shades, and the wall is relieved by Ionic pilasters gilded, with figures of boys with wreaths in a deep cove. A bronze medal is awarded. Another prize (book) is given to A. Nicholas for an over florid rococo treatment in majolica and painted tile, but the proportions are bad, and the detail coarse and vulgar. A. Marshall, Notts, also sends a design. M. J. Dicks, Northampton, takes a prize for a wall paper of pleasing design, and the colour harmony has been well studied. Delicate flowers mix with the foliage, and the surface is well covered. G. H. Rawlings, Salisbury, and W. Bullock, Macclesfield (book prize), also send clever studies. In the latter there is a dark blue ground, relieved by foliage of large green leaves and fruit, but the design is heavy if rich. J. H. Chambers, Halifax, wins a book prize for a pleasing quiet wall pattern, flatly treated and conventional.

Metal work is represented in a few designs, but there is only one that is fairly entitled to a medal. The silver medal has been given to W. Scholar, of Westminster, St. Mary's, for some gates, in the general ornamentation, of which the material has been cleverly considered. The bronze medal is bestowed for a similar subject on C. E. Goodfellow, whose design is also indicative of metal treatment, but rather overdone in the panel, and the gate lacks a deeper bottom rail. W. Gething, Kidderminster, shows the framing to support gate, but the ornamentation seriously contravenes, and is too profuse. Some designs are certainly copies of Sir G. Scott's work, others are taken, with little modification, from Macfarlane's catalogue, as, for instance, two from Belfast, overloaded and florid in style.

For textile fabrics the designs are not, perhaps, up to the mark, but there are a few excellent specimens. Thus, for Wilton carpets, we see one with oak leaves and berries in two or three shades on a green ground with border, but not rewarded; another, by A. Turner, Salisbury (book

prize), has a clever combination of colour. Bronze medals are given to some rich designs—one to S. Pendlebury, Warrington, for a very geometrical and angular-looking pattern, and to another rich though over red design. A. J. Sewell sends a clever design for silk tapestry, chocolate and blue leafage on a black ground, relieved by flowers with white centres. For muslins E. Kerr, Dublin, gets the silver medal for chintz, and W. G. Thomas, Westminster, for muslin—design, Pompeian pattern. For lace a gold medal is awarded to Annie Yeomans, Sheffield, for a handkerchief border—a bold and lace-like pattern; another to J. M. Carr, Nottingham, for a design for lace curtain. While admiring the intricacy and beauty of pattern in the border, we are obliged to say it lacks much in a predominant principle. A silver medal has been awarded to F. Baker, Notts, for a lace curtain, in which the drawing is better; and also to S. Smith, Notts. J. F. Smith, of the same town, receives a bronze medal for a rich design; F. H. Dobles has no prize, though he deserves one; and a bronze medal for a rich shawl pattern has been awarded to H. Horsefield, Notts.

Keramic art does not seem to have called forth much effort. The gold medal, however, has well fallen to G. F. Catchpole (Westminster, Hyde-place), for a set of 8 designs for engraved glass vases. The outline and ornamentation are exceedingly graceful and *récherchés*, of Etruscan feeling; the claret jugs are particularly pleasing in form. The same author takes a silver medal for some designs for tea service. The forms of cups are graceful, and the ornament appropriate, the colours being rich yet delicate. Mary Denley (silver medallist) sends some capital designs for china. We notice particularly a china plaque, unique in design, and pleasing in contrast of colour, but the buff colour vase took our fancy still more. Both in outline and colour—blue on the buff ground of the ware—and the conventional ornament and panel-treated border, there is considerable ability displayed. A bronze medal has been given to M. S. Strong, Notts, for a dish and cover, delicately executed, with natural foliage and flowers.

Ceiling decoration is shown by designs sent in to the Worshipful Company of Plasterers. These display much labour. We cannot conceive how a book prize could have been awarded to one of these the panels of which have huge figures of mermaids and dolphins in exceedingly vulgar taste, while one or two other designs are better. The silver medal is given to a well-drawn and designed ceiling in compartments, filled with delicate Renaissance ornamentation. There is much refinement in the work, but the divisions at the ends are doubtful. The author is C. E. Wilson, Sheffield. We are glad to find this company encouraging correct principles of plaster decoration, and some of the attempts show very clearly that the taste of the decorative artist in this material is somewhat behind. We can only mention a few well-executed and coloured drawings from measurement of St. Stephen's, Wallbrook, and St. Paul's north porch. The gold medal falls to R. H. A. Willis for the former. The sepia drawings, and the prize drawings from the antique, we may refer to another time.

THE LOAN COLLECTION OF ANTIQUITIES AND FINE ART AT THE PARIS EXHIBITION.

THIS collection well bears out its designation—"L'Exposition Historique." It embraces specimens from the earliest period in which the works of man have been found, through the early Gallic, ancient Assyrian and Greek, the Roman and Mediæval times, to the last century—and a most interesting, valuable, and beautiful assemblage is the result. But, alas! there is no catalogue. Such a collection without a catalogue is worse and more tantalising than a book of reference without an index. Nor is this all—in scarcely any case is there any description attached to the object exhibited, and yet the common people who crowd the galleries seem to take great interest in them as works of art. There are ten sections:—(1) Prehistoric Art and Gallic Antiquities; (2) Sculpture—Antique, Mediæval, and Renaissant; (3) Coins; (4) China and Pottery; (5) Manuscripts, Drawings, Books, and Bookbinding; (6) Arms and Armour; (7) Goldsmiths' Work, Ivories, Crystals, and Bijouterie; (8) Furniture and Tapestry; (9) Musical Instruments; (10) Ethnography. The Historical Exhibition of Ancient Art, about which we purpose to write, occupies the left-hand side of the Trocadéro. It is just such a collection as might be selected from one of the huge museums of Europe, and which, if properly described and catalogued, would be of infinite service to students of the history of art. As might be expected, considering the great interest taken in France in prehistoric man, the collection of stone arms and implements is very extensive and complete, being drawn from the cabinets of MM. E. Fourdrinier, Morel, Dumoutier, Du Parc, E. D'Arcy, Raoul Guerin, and consist of specimens found in many parts of the country—Montiere, Theune, St. Acheul, &c.—from the modest flint flakes to the beautiful highly finished and polished specimens which probably were contemporary with much of the bronze. Among other interesting objects are a number of whorls, with a hole through the centre very similar to those found by Dr. Schliemann, and which were, no doubt, used in spinning. Very few things connecting man with the earlier times are more convincing than the scratched representations of prehistoric animals which are occasionally found on bone and stone implements. A pretty complete set of these primitive engravings has been faithfully reproduced upon a highly-polished gelatinous surface, so that they can be seen more plainly than on the originals.

The period following of bronze and other metal is very richly illustrated from public and private sources. We have all sorts of iron tools, some partly of the one metal, partly of the other—armillæ, fibulæ, knives, swords, spears, and articles for domestic use. There is nothing more curious in this part of the exhibition than the case shown by M. Fourdrinier, in which lie the whole contents of a tomb in the same position in which they were found. It is a remarkable instance of double burial, the earliest body having been cremated and put into a rough hand-made urn, which stands at the right foot of the skeleton of the warrior, still in great perfection, who was placed in state on his back, having a huge circular shield on either side, sunk into the ground edgeways, reach to his hand on either side. The iron rims and iron and bronze handles and bosses were found *in situ*, as also his helmet. The shield itself—probably made of hides and wood—had entirely perished. The helmet, of a conical shape, shows a high degree of skill. It was richly gilt and elegantly ornamented, being set with some sort of stones—probably garnets. The workmanship reminds one of the fine British shields dug up from time to time in the Thames, fine specimens being in the British Museum, and there was another in the Merrick Armoury. M. Morel has discovered several similar fragments. Some of the bosses of shields in his case, which contains many fine examples, are as fresh as new, and actually still bear a good polish.

The case full of bronze arms belonging to M. Dziazynski illustrate the early state of civilisation in Poland. In the same room, against the wall, may be seen a large number of *ex voto* silver ornaments belonging to M. Faure. They are very similar to those found in England, made of thin plates with patterns and occasionally figures stamped. The most extraordinary articles of this description are a number of thin bronze plates, which were discovered at Dodona, on the site of the ancient oracle, with Greek inscriptions, some letters being formed of dots pierced through the metal. A full account of the important discoveries made by M. Carapanos has been published under the title, "Dodone et ses Ruines." There are many other rare bronze items with inscriptions, among which are several Heliast tickets for voting in the assemblies.

Of Gallic pottery there is a great quantity, not so rude as British, but similar in design and mode of manufacture.

Two cases of articles belonging to the earlier Gallic period deserve notice and study—one contains gold work found at Buda-Pesth, in Hungary, very valuable in every way. The art had arrived at a considerable degree of progress when some of these fine ornaments were made. One torque, with elaborate ends, was made of four square bars of gold, fastened at the ends, then twisted. It is not a little curious that this same process was practised by ironworkers as late as the 15th century. There was an example in old Hackney Church till a few years ago. There are also some pieces made of thin plates with good ornaments beaten up, consisting of circles, dots, lines, and bead work, and spiral terminations cut correctly out of thick plate. The other case belonging to M. and Mdlle. Fillon, contains some of the very finest specimens we have ever seen. Many of the fibulæ and plates are decorated with *cloisonnée* paste or enamel—in some instances the interstices being filled in with flat cut stones instead of the composition. One or two of the torques and armillæ are of great weight. There is a fine gold necklace made of round and oblong beads, with late gold Roman coins pendent. A dagger, with handle and sheath complete, shows Greek influence very strongly. It is most skilfully cast and chased up, the workmanship being as fine as possible, and the design excellent.

We next go on to the ancient art of the most civilised nations of the world. Assyria is represented by some good sculptures and some very remarkable chasings in bronze, with cuneiform inscriptions round the top. They describe an expedition of Salmanazar II. in Syria and Phœnicia in the 15th year of his reign. They are wonderfully spirited and perfectly wrought—in fact, the Greeks of the best periods did not excel the Assyrians in the technical part of metal work.

Of Greek art there is a perfectly consecutive series. By the windows and standing about the rooms we have some splendid bronze statues, conspicuous among which is the lovely statue of Apollo, found at Vaupoisson (Aube), belonging to the Musée de Troyes; the youthful god stands gracefully beautiful, with the left foot slightly drawn back. There is another from the Musée d'Evreux, of almost the same design, but not so good. The Jupiter from this museum is a fine work; but the figure called Jupiter, belonging to the Musée de Lyon far surpasses it: whether we look upon it as a specimen of bronze work, or on its perfect modelling and natural dignified *pose*, it is altogether delightful. There are rooms full of exquisite bronze figures, too numerous to notice in any detail. M. Carapano's collection, principally from Dodona, contains among other fine things a very important bronze. It is the principal part of a great throne or

chair of state, found in the ruins of the Palace of Diocletian. Up the arms leopards and other hunting animals are pursuing their prey; round the top of the back there are beautiful women, in full relief, and composite animals, half satyr, half horse. It is in a case by itself in the middle of the second room. In the same room there is a beautiful silver bowl, with repoussé and chased subject, representing Venus attiring, while a winged Cupid on either side holds the mirror and other toilet articles. Another grand work in silver should be mentioned. It is a splendid tripod, lately discovered in Hungary, and sent direct to the museum by M. Pulzehi, director of the museum at Pesth. It is very fine, of elegant shape, and in beautiful condition. The principal ornament is an alternation of animals and female heads in relief, full of spirit and beauty. In metal work nothing is more important than the admirable series of collections of coins and medals, which is exhaustive in the exhibition of typical specimens — beginning from the earliest and rudest Gallic and Roman examples—not all earliest, however, in date—including the most splendid specimens of Greek and more modern medallic art. The very rude bronze coinage of Rome, when the assis weighed a full pound of copper, and similar primitive pieces, form a good contrast with the lovely medals and coins of Syracuse and other flourishing Greek colonies. What will strike all collectors most is the beautiful condition of the greater number of both the coins and medals. An opportunity is given, too, of comparing the finest ancient work with some of the finest that has been done in Europe during the last 200 years, for in the Exhibition buildings a whole room is devoted to the display of the principal medals executed for the Kings and State at the Royal Mint, with the original chasings in steel that were prepared for them. It is to be hoped, now that the natural history collection is to go from the British Museum, and there will be more room, that a perfect typical series of the coins and medals of all ages will be set out for the instruction of the public, and that the misleading electrotype copies will be withdrawn.

HASTE IN BUILDING.

LAST week we referred to the too common practice of "building on stilts"—we may now call attention to an equally reprehensible practice, indulged in largely by speculative builders in the suburbs of London, of "running up" the carcase of a house with undue haste. There may be some excuse made for the endeavour at this particular season of the year—the uncertainty of the weather to wit—to get a building covered in as quickly as possible; but there is no kind of explanation that will justify that extreme and reckless building of which we lately had an instance at Hackney. Within a stone's throw from the "Elephant and Castle" may be seen a brand-new front, cornice high, which ten days ago had not even been commenced, and such instances may be found almost anywhere on new building estates. Those who are practically acquainted with the mystery of the building craft know that this extreme hurry is as much in the interest of the builder's pocket as it is for the sake of securing immunity from wet weather. The builder gets a "draw" when the roof is on, or a fresh mortgage from the mortgagee—in the latter case so much material only is regarded as the security for the loan, and there is every inducement to the dishonest tradesman to "scamp" his house. In truth, there is very much more encouragement for a speculative builder to scamp than to build well, offered by the very precarious nature of leasehold property in London. Hundreds take land on expiring leases, and build accordingly; we cannot blame the speculator any more than the landowner, as both are the creatures of competition, supply, and demand, but we can certainly regulate the evils caused by salutary checks. From Highgate and Hackney Wick on the north, to Peckham and New Cross on the south, we may see at the present moment acres of beautiful pasturage being covered over by the largest bidders in the most reckless manner. The houses must be built quickly and cheaply that the builders may reap the highest advantage for their labour; the tenants are taken in, and the building society or the landowner ultimately gets the property, or makes the largest profits. But to turn to the effect of haste in building. It is a well-known fact that in some cases the surveyor has to extract a pledge from the builder that not less than half the bricks used shall be whole bricks. Cinder shiftings are largely used for sand in many localities we have inspected. Only last year a builder at Hammersmith was fined for building a wall with broken bricks after repeated applications made by the surveyor. Hasty building is both the cause and consequence of bad materials. It is a cause when the builder hastens to use up his old "bats" and bad mortar, and it is the effect because there is no "bond" required, and the first broken brick that comes to hand may be employed. Then a hastily-erected wall can neither have bond, nor can the mortar have any coherency—a fatal cause of weakness, and a culpable result of negligence. Certainly we have a grievance here that calls for an active check if we are to be saved from a recurrence of those painful building casualties we read of now and again, when a number of innocent, though foolhardy, men risk their lives on scaffoldings supported by masses of disconnected bricks.

THE MOST ANCIENT LAND SURVEY IN THE WORLD.

HERODOTUS, the father of history, tells us that the science of geometry originated in Egypt, where the practice of land-surveying was first rendered necessary by the frequent obliteration of landmarks, through the periodical overflows of the river Nile. Plato ascribes the invention of geometry to Thoth. Iamblichus says that it was known in Egypt during the reign of the Gods; and Eustathius, in speaking of an age long before the Greeks were sufficiently advanced to study or practise the art, says that the Egyptians "recorded their march in *maps*, which were not only given to their own people, but to the Scythians also, to their great astonishment." The frequent changes of surface must have rendered the land-surveyors' a rather busy profession in ancient Egypt, and a considerable body of them were employed by Rameses III., whose office is thus described by Herodotus: "If the river carried away any portion of a man's lot, he appeared before the king and related what had happened, upon which the king sent persons to examine, and determine by measurement, the exact extent of the loss; and thenceforth only such a rent was demanded of him as was proportionate to the reduced size of his land. From this practice, I think, geometry first came to be known in Egypt, whence it passed into Greece." Whether these ancient land-surveyors made plans of the land they measured we cannot say, because among the copious records of Egypt no agricultural plans, so far as we can at present remember, have yet been found. There are some plans remaining of royal tombs, with dimensions carefully figured in cubits, and also of the turquoise mines of Wadi-Magarah, facsimiles of which have been published by the German Egyptologist, Dr. Lepsius; and there are verbal records of the boundaries of particular lands, but none of the maps mentioned by Eustathius, or of those which possibly were drawn by the surveyors of Rameses or their successors.

Discoveries recently made, however, at the British Museum among the cuneiform inscriptions on the terra-cotta tablets of ancient Babylon, render it questionable whether the Babylonians should not have at least equal credit with the Egyptians, for the discovery of the science of geometry, and of its application to land-surveying and the delineation of plans. The country between the Euphrates and the Tigris was very early inhabited by a land-owning population, and was subject to the same vicissitudes of periodical overflow by the rivers as Egypt; and like circumstances produced similar effects upon their progress in science and arts. Laws for the regulation of property in land may be traced as far back as the days of the Kassite kings, B.C. 1656, which are written in the very earliest Turanian, or Accadian, dialect of the country, and which have just been translated by Mr. St. Chad Boscawen. Several curious particulars are found in these most ancient tablets. For example, it appears most clearly that the women of Babylonia could hold real property, that land could be mortgaged, and that it could be pledged, together with other things which modern civilisation does not allow. Thus one tablet says: "His house, his grove, his field, his slaves, male and female, for silver he has pledged." We learn also that the interest charged upon these transactions was often as much as 30, and sometimes even 70 per cent.

The actual definition of the boundaries of land was effected in Babylonia by boundary-stones, on which were carved not merely a statement of the boundaries, but words which constituted the stone itself the actual deed of gift or sale. One of the most noticeable of these boundary stones in the British Museum is a large stone bearing an inscription of Merodach-baladan I., B.C. 1200, presented by the proprietors of the *Daily Telegraph*. It records a gift by the King of a plot of land to a person named *Merodach-sum-Izakir*, as a reward for political services. It gives no dimensions, but carefully describes all adjoining properties, and is attested by many witnesses. Another conical black stone, dated B.C. 1150, is extremely interesting, as giving the price paid for the purchase of the field—viz., 616 *mana* of silver; but inasmuch as this price was paid in kind, not in cash, we have an enumeration of the different articles, with their respective values, among which are:—"One chariot, with its harness, for 100 silver; six riding horses, equal to 300 of silver; a cow in calf, some asses and mules, as well as numerous pieces of cloth." This stone also gives us the name of the ancient land-surveyor, who not only defined the boundaries, but also assessed the value of all these chariots, cows and calves, and asses and mules. Let the land-surveyors of the 19th century learn to reverence the name of this man, who, until Mr. Boscawen unearths some still older tablet, must remain the father of their art. His name was SAPIKU, the son of *Merodach-baladhu*, and he is expressly called *Masakhu*, the field-measurer.

The number of documents (that is, terra-cotta tablets) which the Museum now possesses in relation to the commercial and land transactions of ancient Babylon and of Assyria is very great, a collection of more than 2,000 having been purchased at Baghdad in 1875. Mr. Boscawen published an account of some of these last year in a literary contemporary,* showing that they formed a tolerably complete record of the

* The *Academy*.

business transactions of a great Babylonian firm, who traded under the name of Egibi and Sons, as bankers and state land agents. Their records relate to every kind of transaction—land sales and leases, loans of money, mortgages, sales of slaves, and dealings in all kinds of property—and the documents show that they traded in this manner from the first year of Nebuchadnezzar, B.C. 605, till the last of Darius Hystaspes, B.C. 486, a period of about 120 years. There are many interesting facts as to the daily life of the ancient people to be gathered from them, but that which it is our present purpose only to notice is the tablet which contains, not simply a description, but an actual *plan*, of the land referred to in the document, just as plans are now drawn on parchment in the margins of leases. This, we think we may safely say, is at present the oldest known land-survey in the world. It is drawn on a tablet in dark terra cotta, about 6in. by 3½in., and represents a plot of land about 8½ acres in area. The inscription at the top informs us that it is the plan of "A field in the high road on the banks of the river or canal," Nahr Banituv. The name of the river, however, is obliterated, and its place has been supplied by Mr. Boscawen from information drawn from other tablets relating to adjoining property. The estate is divided into three pairs of parallelograms, to which are added two more similar-shaped plots, and an irregular trapezoidal piece. The dimensions are all given in cubits, or fractions of cubits, most carefully figured on the drawing. Taking the Babylonian cubit as 20·475 English inches, the greatest length of the estate would be, from north to south, 1646 cubits, or 936yds. 0ft. 5in English. The width on the northern border on the edge of the highway is 84 cubits = 140ft. The dimensions on the southern part being much defaced, it is difficult to ascertain the length of the base line. On the east side the curve is most carefully measured, its circumference being 120 cubits, or 200ft. A small dimension has been marked in the interior of the arc, which evidently represented its radius, but it is unfortunately obliterated. The northern boundary is the highway, or, as it is called in another document, "the royal highway." (It is interesting to notice such a very ancient use of our present common phrase, "the king's highway.") The western side adjoins the lands of Ipriya and Buruga, the son of Taria, the son of the Chief Builder, and this latter person is the owner also of the land on the southern boundary. The eastern side and the upper portion adjoin the lands of Nabu-sar-ibni, and another portion adjoins the lands of Kasiya, the son of Dibzir, the son of Pitu-sar-babi. It would seem strange for a modern surveyor to mark upon his plan, not only the name of his client's neighbours, but those of their fathers and grandfathers, yet this practice has revealed to us the fact that the ancient Babylonian "Chief Builder," or architect, was a person of some consequence, who left lands behind him, and grandchildren to be proud of their descent from him; and not the serf, or servant, which he was mistakenly represented to be in one famous modern picture.

As an example of the system of mensuration, and curious method of computation of the area, which was according to the amount of corn seed required to sow it, we make the following extract from a tablet dated in the third year of Nabonidus, king of Babylon:—

1. 949 cubits on the upper side towards the west a boundary is fixed.
2. By the land of Nabu-sum-utsir, the giver of the field.
3. 949 cubits on the lower side towards the east the boundary is fixed by the land of Nabu-sar-ibni, son of Marducu.
4. 40 cubits the upper headland, a boundary line is fixed by the king's highway on the bank of the canal of Banituv.
5. 40 cubits the lower headland, a boundary is fixed by the other portion of the field.
6. For this field, and this portion, five measures of corn seed. A field with the wells attached.
7. A valuation of 5 epha, 8 measures of corn seed. This is the first measurement.

This represents the measurement and sowing area of the first portion of the land sold in the tablet. A second portion, which joins on to the southern border, is also computed by a similar arrangement. A summary of the two results is given, and the price in silver, according to the market value of corn, is computed and entered as the price of the land. A guarantee of about one-tenth per cent. is required and given as security for the fulfilment of the clauses of the deed. The names of seven witnesses who attest the deed, by affixing their *nail-marks*, and the scribes, who append their seals, testify to the legal character of the document.

Such was the legal procedure in the conveyance of land 2,500 years ago in ancient Babylonia. How little it differs from the legal acts and deeds which are daily transacted in our modern Babylon of London, and in this Great Britain which has just assumed new responsibilities in relation to the old country whence these antiquities have been exhumed! W. H. R.

OUR COMMONPLACE COLUMN.

CATTLE SHED.

THE most economical form of building cattle sheds is that of a lean-to roof, sloping from a wall or other building. Double sheds are more economical than single in isolated positions. Bullock sheds should not be less than 19ft. to 20ft. wide, and be well drained and ventilated, with facilities for feeding and cleaning the animals. The roof should have openings in it, or louvre boards that can be easily opened or shut.

CAVÆDIUM.

This is a term used in ancient architecture to denote an open court within a house. Vitruvius divides cavædia into five classes:—Tuscanicum, Corinthium, Tetrastylon (four columns), Displuviatum (uncovered), and Testudinatum (vaulted).

CEILING.

This term means generally the under surface or covering of a roof or floor. Of wooden ceilings the reader is referred to many of the middle-age examples, such as those at Peterborough Cathedral and St. Alban's Abbey, which are painted and gilded, and charged with shields and other devices. Perpendicular ceilings are very rich, and perhaps may be admired most for showing a legitimate treatment of material. In this style they are flat or slightly pitched, and are divided into compartments by moulded ribs, examples of which are to be seen in many of the old churches and halls of the 15th, 16th, and 17th centuries. In the Elizabethan halls and residences plaster ceilings were richly ornamented with panels of various geometrical forms, and many good examples of the 17th century are to be seen in London. In Lambeth Palace, in Lime-street, Bishopsgate-street (Sir Paul Pindar's house), and in some of the older streets, admirable specimens of plaster ceilings were to be found, which we have lately referred to in the BUILDING NEWS, but many of them have been demolished of late. The characteristics of some of these ceilings are lightness and elegance of design, and a correct treatment of plaster decoration. The ribs are generally small and moulded, and the ceiling surfaces kept flat. In the Queen Anne and late 17th century work elegance is often lost in profuse ornamentation, such as swags of festoons, rococo foliage in high relief, and we lose the simplicity of the lighter kind of treatment.

CELL OR CELLA.

This was the portion of the temple contained within the walls, called also *naos*.

CEMENT.

We shall confine our remarks here to a few properties of those cements mainly used in building. *Portland Cement*, made from a mixture of chalk and clay, burned in a kiln, and afterwards ground into a fine powder, is the strongest and best. The proportions of clay and chalk vary. In the white chalk districts 25 to 30 per cent. of clay is used, and in the grey chalk from 15 to 20 per cent. Good Portland cement is of a blueish grey colour; and the heavier and finer the cement, the stronger it is considered. Mr. Reid, in his "Treatise on Portland Cement," says we should find the kiln clinker to be of a dark greenish mass, and homogeneous, if of good quality. A brown coloured clinker, dusting freely, indicates a faulty character; one of great density, and blackish, and producing a blueish grey powder, is dangerous, and unfit for use until after exposure; while "a true clinker, of a greenish tinge, from which a light grey powder is obtained, is capable of being used at once." See chapter in Mr. Reid's treatise on "Cement Testing." The weight of Portland cement varies from 108lb. to 120lb. per bushel. The slowest setting cement is generally the strongest. Hurst gives the following average tensile breaking weight attained by Portland cement when immersed in water after setting:—

At end of 7 days	= 270lb.	per sq. inch.
,, 1 month	= 310lb.	,,
,, 3 months	= 775lb.	,,
,, 12 months	= 900lb.	,,
,, 5 years	= 963lb.	,,

Roman Cement contains a larger proportion of clay, and solidifies more rapidly. It is of a dark brown colour, but its strength is less than Portland. *Hydraulic Cement:* Hydraulic properties of cement depend upon the combination of the lime with silica and alumina, forming first a hydrated compound, and finally a true silicate. Puzzolana, a porous lava from Naples, is chiefly composed of silicates of alumina, lime, and soda, and when mixed with lime forms a powerful hydraulic cement. *Keene's Cement* is prepared by steeping plaster of Paris in a concentrated solution of alum, then recalcining. It is well adapted for internal stucco and decoration, takes a high polish, and when coloured produces admirable imitations of marbles, scagliola, &c.

For further particulars the reader is referred to Higgins's "Treatise on Calcareous Limes and Cements;" the treatises of Grant and Reid; see also BUILDING NEWS, Vol. XXXIII., pp. 478, 532.

CEMETERY CHAPEL.

Cemetery chapels are generally planned as simple parallelograms, with a circular apse at one end, a porch for hearses and carriages, a waiting room, vestry, &c. The dimensions for a small chapel are usually about 50ft. by 18ft. or 20ft. Benches for mourners are provided on each side in single or double groups, between which should be a wide space for the bier. Sometimes the apse contains an altar. A mortuary chapel usually provides in addition, a dead house, and an inquest room, as in the case of the Nottingham chapel, illustrated by us in the BUILDING NEWS, page 304, Vol. XXXIII. See also design published page 100 of the same volume, other designs will be found in Vol. XXXIV., and a review of the designs submitted to the BUILDING NEWS club, page 663, Vol. XXXIII. One of the oldest and most celebrated cemeteries in Europe is the Père-la-Chaise, near Paris, the general arrangements of which appear to have been followed in England. Highgate, Bethnal-green, Norwood, and other provincial cemeteries are well known.

CENOTAPH.

From the Greek, *kenos*, empty, and *taphos*, a tomb, is a monument which does not contain the remains of the deceased. A cenotaph takes frequently the form of a mural monument, and is often erected before the death of a family or individual.

CENTREING.

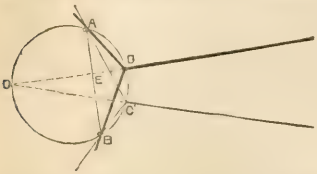
The leading principles to be observed in designing centreing are the following: That the strains should be resisted by the pieces in the direction of their length—*i.e.*, the timber should be so arranged that the strain shall be simply a thrust, and that the pieces should not be so long as to bend under the stress. The pieces subject to pulling stress should be well connected at the joints, and these should be secured by straps and shoes. The pressure on the centreing when the arch is being constructed tends to depress the haunches and to raise the crown, and this tendency should be counteracted by

proper braces. For examples of centres the reader is referred to that of Perronet for the Neuilly Bridge, and the centreing used in the Waterloo Bridge. See also articles in the Building News "Architectural Science Class," p. 559, Vol. XXXI., and p. 49, Vol. XXXII.

CENTROLINEAD.

For the method of setting this instrument we refer to previous articles in the Building News, p. 404, Vol. XXXII., and numerous other notices in our "Intercommunication" columns.

"W. R. L." sends the following notes on the centrolinead:—To show that lines drawn by the centrolinead converge to a point in the circumference of the circle determined by three points—viz., the studs (or points of revolution) and the apex of the angle formed by the short arms, let A B be the studs and C the apex of



the angle of the arms. If a circle be described through A C B, then the vanishing point, O, shall be in its circumference. Describe arc, A C B. Revolve the centrolinead to any other position, A D B, and it will stand on the same segment, A C B (Euclid, 3-21), therefore A D C B are in the same arc. Describe arc, D B O. Because angle O D B is equal to angle O C B (that is, the angle of blade and arms is constant) they are on the same segment; therefore D C B O are in the same arc. But the arc, A D C B, passes through three of these points—that is, two arcs pass through D C B. Therefore they are arcs of the same circle (Euclid, 3-10 and 3-13). Therefore the vanishing point, O, is in the circumference described through the points of revolution and the apex of the angle of the arms. This is the property on which the setting of the instrument is effected for calculating by trigonometry or construction the distance of the vanishing point from where you can conveniently place the studs, then by Euclid, 3-35, AE·EB = OE·ED, and three of these being known, the other is obtained from the above equation, and the angle of the arms set accordingly. A good plan is to work out this angle for a certain position of the plan (to which you can often work), and cut out the angle, A D B, from the back of a T-square. A plan for working with a 2ft. rule and a T-square has been published.

CHANCEL.

In a restricted sense, the term chancel (*cancellus*, a screen) undoubtedly means that part of the church in which the altar is placed, and much controversy has arisen respecting the position of the latter. In a less restricted sense, the word is applied to the whole of the eastern portion of a church, appropriated to the use of the clergy and choir. It is often separated by a screen, and raised two or three steps above the nave. On each side are two rows of benches or stalls for choristers, and the organ frequently forms a chamber or recess on the north or south side, attached to which there should be a vestry for choristers and another for the clergy. The easternmost division of the chancel is called the *sacrarium*, which is railed off with a step for communicants; sedilia for the clergy, a piscina, an aumbry for the sacred vessels, and a credence table or bracket are generally provided in large churches. The latter is placed on the south side of the altar. For the width of a chancel 16ft. to 18ft. is generally allowed, its length varying from 18ft. to 30ft., or more.

"C. F. W." sends the following:—Chancel is the most eastern portion of a church, being screened off from the nave. It is appropriated to the sole use of those who help in Divine service. The chancel is usually divided into two parts—the choir and the sanctuary. It, however, may, in some cases, be divided into the parts—the *choir*, the portion occupied by the choir or singers, from which it derives its name; the *presbytery*, the space occupied by the canons, clergy, and the bishop's throne. Beyond this, within the altar railings, and generally raised by three steps, is the *sanctuary* or sacrarium, corresponding to the adytum in Greek temples. In Lincoln Cathedral the presbytery is behind the sanctuary. The chancel owes its origin to the recesses used for the symbol of a deity in the primitive times. It assumes the form of an apse in the Roman basilicæ, and in the Romanesque or Norman style it preserves the same form. In Gothic architecture the chancel becomes elongated and rectangular. In Indian and Egyptian architecture an adytum or chancel is also found. Occasionally we find deflecting chancels, symbolical of our Saviour's head leaning to one side when on the cross. The following examples of this peculiarity we have taken from the *Penny Post*, 1877, pp. 165, 220, 275:—Holy Trinity, Horsham; All Saints, Loughborough; St. Mary, Bathwick; Chalfont, St. Giles's, Bucks; deflect to the south. The chancel of the church at Eastbourne deflects towards the south-east; Hayes Church, Middlesex, to the north-east. The following deflect to the north:—Hammoon, Dorset; St. Julian, Wellow, Somersetshire. Sometimes chancels are built at the west-end, as at St. Peter's, Southborough, near Tunbridge Wells.

CHANTRY.

Chantry (from French, *chanter*, to sing) is a term formerly applied to the bequest which ordered that masses should be chanted for the soul of the testator. In some cases it ordered that a small chapel should be built over the spot where the body of the testator was buried. Amongst the most noted we may mention the chantry of John de Wickclyffe, in Winchester Cathedral, and that of the unfortunate Countess of Salisbury, the mother of Cardinal Pole, in Christchurch, Hants. It is built of Caen stone, beautifully executed. It, however, suffered greatly from the vandalism of the Commissioners of Henry VIII.—C. F. W.

CHAPTER HOUSE.

From French *chapitre*. The building in which the monks and canons of monasteries, and the dean and prebendaries of cathedral and collegiate churches, meet to conduct business. The plans of chapter houses vary; generally they are octagonal or rectangular, and sometimes of other forms. The chapter houses of Westminster, York, and Salisbury are octagonal; Lichfield is an oblong octagon in plan, Lincoln is a decagon, and Worcester a circle. They are placed generally on the west side of the transepts. Mr. Mackenzie E. C. Walcott observes that the forms of chapter houses were determined by the wants of each community, and did not vary, as thought by some, with the date. Thus, *Benedictine* were oblong, as at Canterbury, Gloucester, Chester, Winchester, &c.; *Cistercian* square, as at Kirkstall and Netley; *Clugniacs* oblong; *Austin Canons* oblong, as at Bristol; and *Secular Canons* polygonal, as at York, Salisbury, Lincoln &c. We refer the reader to Mr. Mackenzie Walcott's contribution, p. 65 *ante*.

CHOIR.

Choir is described by Durand as "the part where the clergy assemble to sing." We have alluded to it above as the portion occupied by the singers. "Though modern ecclesiastical writers dissemble or deny the use of dancing in the religious ceremonies of the Church," says Dr. Burney, "yet the numerous anathemas against it in the works of the Fathers are sufficient proofs that it had been practised among the primitive Christians, as well as by the Hebrews and Pagans" (quoted in the *Musical Times*, March, 1878, p. 134), whence we also extract the following:—"Le Père Menestrier, referring to the religious dances of the ancient Hebrews, mentions that the choir is still retained in our churches for 'that part of a cathedral where canons and priests sing and perform the ceremonies of religion,'" and he further remarks that "the choir was separated from the altar, and was elevated in the form of a theatre, being inclosed on all sides by balustrades. The term 'choir' was used in two senses: as a company of dancers and as the place in which they danced and sang." In Spain dancing formed part of Divine service in the days of Burney. "Even at the present time—on the Feast of Corpus Christi—a number of boys . . . . perform slow and solemn dances before the Holy Sacrament, accompanied by voices and the organ." Bishop Odo, of Paris, abolished dancing during Divine service in the 12th century.—C. F. W.

CONCRETE.

Concrete for damp foundations, &c., should be made with hydraulic lime or Portland cement. The proportions commonly adopted are 6 parts of gravel (screened) or broken stone, 2 parts sand, and 1 of ground lime or cement; or 7 parts of Thames ballast to 1 of lime or cement. For trenches some architects specify that it should be thrown from a stage of from 5ft. to 10ft., for the purpose of consolidation; others prefer ramming the concrete in layers of 6in.; while a few authorities, however, assert it is only necessary to turn over the ingredients of the concrete so that every piece of material is covered with the cementing medium, and then to deposit it, and trim it level. *Strength*: Comparatively speaking Portland cement concrete is nearly double the strength of the best ground lias lime. The *Fire-resisting Qualities* of concrete are well known, and burnt ballast or breeze has been used with Portland cement for floors, landings, roofs, arches, and beams. Concrete is chiefly to be depended upon as a material when subject to compression. *Proportions*: In practice, says Hurst, 1½th cubic yard of Thames ballast is allowed for each cubic yard of concrete, including waste. For experiments and other particulars we refer to the various notices of this material that have appeared in the Building News from time to time.

COTTAGES.

"T. S." writes:—*Accommodation and Arrangement*: The size and number of rooms in a cottage should be in proportion to the number of its occupants. An ordinary cottage for a labourer having the following: Living room, entered from lobby, scullery, and three bedrooms, with pantry and other conveniences; living room with a superficial area of at least 150ft., and 9ft. high; windows and doors arranged so as to leave one end with fireplace free, also as much of one side as possible, and, if cupboard, it should be placed on the opposite side of room to the fire-place; scullery with an area of about 70ft. superficial, with set pan, sink stone, water supply, and small firegrate, leaving room for washing or wringing machine. Three bedrooms, varying from 80 superficial feet upwards, 9ft. high, entered from landing, each with sufficient room for bed without interfering with half the door or window. The bedrooms should have wood floors, others stone or brick. *Points to be guarded against*: Building back-to-back cottages. Staircase in centre of cottage; sinks inside of a cupboard; waste pipes connected with drain at inside of house; cesspool under or close by a house; sleeping or living rooms below ground level, without open area in front and the whole length and depth of walls. *Foundations*: Where soil is naturally wet, a damp course of slate, lead, or boiled pitch, tar, and sand laid on the walls below ground floor level usually 6in. above ground line, will prevent dampness in walls. Hollow external walls add greatly to the dryness of a building. *Drains* ought never to enter a house, and where obliged to go under, great care should be taken in giving them a solid and firm foundation, and the sockets securely jointed with Roman cement, all other joints with clay. Drains should be trapped near to every inlet. All waste pipes, &c., should be discharged in the open air over a grate or inlet to drain. Provision should be made for taking away surface water; also it is some times found advisable to drain the soil where very wet. *Light* is very essential to make a cottage cheerful and healthy, and should be well diffused over all parts. Each room and staircase should have a window opening directly on the external air. *Ventilation*: The lobby, staircase, and landing ought to be ventilated by means of a direct communication with the external air on ground floor, and an escape for foul air through ceiling. Then each room near to ceiling should have a horizontal communication with the lobby stairs and landing, and at the opposite side of room an outlet at ceiling level. Bedrooms without fireplaces should be specially ventilated in this manner.

Notes or contributions on subjects under the letter C will be received on or before the 20th instant. The following are a few terms upon which information will be received:—Chimney, choir screen, ciborium, circular buildings, circular stairs, cistern, clock-tower, cloister, cofferdam, collar, colonnade, column, composite order, composition, convent, cortile, credence, cromlech, crown-glass, cube, curb-roof.

THE ARCHITECTURAL ASSOCIATION IN YORKSHIRE.

THE not very attractive town of Hull is this year the centre quarters of the Architectural Association Excursion Party, who this week are holding their ninth annual excursion; Mr. H. L. Florence being president. It has been an old saying—"From Hull, H—, and Halifax, grant us deliverance!" and although to most minds some truth may be found underlying this ejaculatory prayer, Hull, no doubt, is the best centre which could have been chosen for the members of an excursion visiting the south-east corner of Yorkshire, including in its programme Selby and Howden on the west; Swine, Skirlaugh, Aldborough, and Patrington on the east; Beverley and Cottingham to the north; and Barton-on-the-Humber, with Thornton Curtis, on the south, Mr. James Fowler, architect, of Louth, is conducting the excursion; and we are indebted to him for the loan of his notes, which we have not failed to use as a supplement to our own in here describing the places visited. Most of the members present arrived in Hull on Saturday and Sunday, so that with two or three exceptions the visits of Monday—the opening day—were made by the whole party. Leaving the head-quarters by half-past nine by carriages, Preston was reached in less than an hour. Here the church is well situated with reference to the surrounding houses, though these possess no interest whatever beyond giving a picturesque grouping to the whole. The church consists of a nave of four bays, north and south aisles, with chancel. The west tower is a very commanding feature, and is of four unequal stages, with square buttresses carried up to the middle of the belfry stage, where by a simple and clever arrangement they are placed diagonally, and carried up and finished with pinnacles over the parapet, which is modern. The buttresses have niches for statues in the second stage. In the belfry are two three-light windows on each face, with hood moulds, from the intersection of which a column is carried up to the cornice, bisecting the parapet and space below, and terminating in a pinnacle smaller in size than those at the angles. The belfry stage is thus unusually rich for the district, and the town is of exceedingly good proportion. On the north and south sides of the tower below the belfry-stage is a small single light, with canopied heads, and in the next stage on the west side a four-light window with low pointed arch, the hood-mould being ogeed and carried up to a niche, with statue still remaining. A deeply-recessed door below forms the west entrance to the church. Internally, the north arcade and aisle are of Early Geometrical work. The piers are broad and low, and the arches well set upon them. The north doorway and one of the coeval windows remain in part on the north side. The doorway is a very good example, consisting of two filleted beads, and the hood mould terminates and is carried on a slight buttress with very pleasing effect. The buttresses are simple, with good projection, and have the string-course carried round them. The south aisle is 15th-century work, and has been entirely re-built. On the wall west of the porch an ugly red-brick affair, quite modern—may be seen—remains of an earlier church. The chancel aisle is used as a vestry. The chancel was some time since restored by Mr. Ewan Christian, and the remainder of the building is proposed for restoration—Messrs. Smith and Brodrick, of Hull, being the architects. The tower was erected subsequently to the nave, as may be seen from the buttresses, and later mouldings may be traced. The hinges of the door are good. The present roof of the nave is not original, as the principals do not correspond with the wall corbels, while the pitch of the older roof may be seen by the wreathing on the east wall of the tower, where the string-course is at a higher level than on the other sides to escape the ridge, and an increased perspective effect is the result, which is worthy of remark. The parapets of the nave are pierced in a singular manner. Leaving Preston, the neighbouring church of Burton Pidsea was soon reached, where the church has some peculiar and interesting features. It was originally of Early English character, as may be seen by the responds at the east end of nave, and the arcade in the chancel, as well as at the east end of the south aisle. The building was altered materially in the 14th century, when the arcade was rebuilt, and, singular to say, on hexagonal pillars placed with their sides to the east and west. The aisles were also at this time rebuilt. The tower is also of later date, and is erected entirely within the nave arcade, the connection being curiously managed, and without evident reason, seeing that the space to the west would have permitted the erection of the tower beyond the earlier nave. The tower is wider from north to south than from east to west, being about 21ft. by 18ft. The west windows of the aisle are of early 14th-century work. The east end of the south aisle was formerly a chapel, the piscina remaining in the south wall, and a chapel was also attached to the end of the chancel aisle, the piscina, and statue bracket. The window is a three-light one, of Decorated character, and on the north side of the chancel is a square-headed window of the same period, with two lights. The window in the east wall of the vestry is a good lancet, with a rather unusually bold chamfer, and a hood mould enriched with dog-tooth ornament. The tower is by no means so good an example as that of Preston, and the church is disfigured with hideous coloured glass in the diamond quarry glazing. It was restored by Mr. Smith, architect, of Hull, some years since. The font has a plain cover over, and this is perhaps as well, as it hides from sight the dirty water in the common basin within, where there are some candle-ends. A severe thunderstorm here overtook the excursionists, which caused some little delay, refuge being taken in the Nancy Inn close by. The vicarage is a red modern characterless building to the east of the churchyard. The rain clearing off, a smart trot soon brought the party to the prettily situated, but almost desecrated, church at Humbleton, where the visitors were met, as in the last case, by the vicar. The building is of thirteenth-century foundation, but has been considerably altered. It consists of a nave, with north and south aisles, and chancel, with chapel on its south side. The south arcade, of four bays, is of about 1240 date, as is the chancel arch. The jambs of the east window are of Geometrical character. The north arcade and chantry are fifteenth-century work, together with the tower. The windows of the north aisle, though in an exceedingly dilapidated condition, are very good examples, and those of the south aisle are rather large for such a church. The staircase to the tower in the interior of the nave is a singular feature, being corbelled out over the first stage to the exterior of the tower. The south porch is very ugly and modern, but a fine doorway, with oak door of the same period, remains. The tower is of three stages, and has on the west side a good three-light window. The buttresses are carried up diagonally, and terminate in bold pinnacles with embattled parapet. The ground story of the tower communicates with the nave by an arch, but this is blocked up and filled with lumber, while the westernmost bays of the aisles are also screened off for the reception of coals, wood, and débris, which would be better suited to an outhouse or a farm. The space in the tower would form an admirable baptistery. Perhaps the most singular feature in the building is the strange position of the pulpit, which is carried on an arch of wood immediately over the centre aisle in the nave under the chancel arch. The arched canopy is supported by four Tuscan columns, about 4ft. 6in. high, and the pulpit is reached by a staircase on the north side. A peep at the altar is thus obtained under the arch, while the preacher is insured a prominent position at any rate. "Private boxes" are arranged throughout the building in a comfortable way, so that, with the red graining and cushion of the pulpit, in contrast with the green weather stains in the aisles, an interior is obtained at once worthy of a note and water-colour study by the anti-restoration society. If, however, Humbleton Church requires restoration for decency's sake, it is not of the kind to which the once charming Church of St. Bartholomew, at Aldborough, has already been subjected, and which cannot be too severely condemned. The tower, however, with its fine arch of Lancet period, at the west end of the nave, remains comparatively untouched. Fragments of Norman work remain, but have been tooled and inserted in the new work. The rebuilt church was erected between 1353 and 1377, and the last re-erection took place about six years ago, under the supervision of the late Mr. Perkin, of Leeds. The Saxon church was no doubt destroyed by sea; the inscription yet remaining describes it to have been ordered by Ulf to be built "for the souls of Hanum and Gunthard." Ulf was lord of the manor in the time of Edward the Confessor, and conferred many manors on the Church of York. The low and well-proportioned arcade of the nave is well suited for a small church, and must before the restoration have been of much beauty. The west window of the tower is Transitional, with a later insertion. Some fine monuments, with effigies, exist in the north aisle and chancel, but these have been sadly mutilated by the children when the church was used as a parish school. The helmet hanging from one of the tombs was then used as a coal-scuttle. The monuments are of Sir John de Meaux, who died in 1377. The effigy is unusually long, being 6ft. 6in., and 2ft. across the shoulders. Six griffins volant of Meaux are displayed in the robes of the female figure and the shields of the first-named tomb. A drive of about a mile brought the excursion party to the sea-shore, where a hearty, if frugal, lunch was obtained. On the return journey to Hull Skirlaugh was visited, with its small but unusually interesting church, which consists only of a nave with western tower. It was built by the celebrated Bishop of Durham, Walter Skirlaugh (1388-1405), as a chapel, and it is an excellent example, in a fine state of preservation, of Early Perpendicular work. There are six bays in the nave, which are externally marked by boldly projecting buttresses, pinnacled, while a lofty and rich parapet surmounts the whole. The east end, instead of being gabled, has a straight parapet at a higher level, and the original roof remains. The singular defect peculiar to this district in the tracery of the windows of this date was pointed out by Mr. Fowler—viz., in not having the mullions carried up straight to the arch, so that the tracery by this deficiency is rendered somewhat weak. The interior is simple, lofty, and well-proportioned, without division for chancel, which was originally marked off by a screen no longer existing. The tower deserves the closest study, and was at once the subject of many a sketch during the short visit of Monday last. It is illustrated by Pugin in his "Contrasts." It is of five stages, and is finished with an embattled parapet, and pinnacled buttresses of much beauty. We understand that the building is shortly to be restored, but we sincerely trust that the utmost care will be taken, and, indeed, very little, if anything, done, as the work is in so admirable a condition. Messrs. Botterill and Son, architects, of Hull, are, we hear, the architects engaged. To any one wishing for a small and good example of Late work to measure up, Skirlaugh might with considerable advantage be chosen. Nearing Hull after a pleasant drive, Swine was reached, where the "Swynhumbe" was a port in the time of Edward I. The church formerly belonged to St. Mary's Priory, and though it has been restored it is well worthy of a visit. The nave has four arches on either side, of Transitional character (1150), with boldly projecting caps, though the arches sit uncomfortably upon them. The church was originally cruciform. The present tower is said to date from 1787. The clerestory is of very Early Pointed work. The east window is of seven lights with a somewhat depressed arch. Some good screen work has been re-used by Mr. Christian in forming the present low chancel screen, with its gates, and a screen of much beauty remains in the north or Hinton Chapel; it was added by Lord Darcy in 1531, when he

was lord of Swine. Some monuments to the lords of the manor remain in this chapel, and in the south aisle are two Hinton effigies, circ. Richard II. All are much defaced. The pulpit is of Jacobean character. The restoration generally is carefully executed; but why a new iron cross should be placed over the centre of the nave, we are at a loss to learn, seeing that it marks no division of the church, and certainly looks out of place. Head-quarters at the Royal Station Hotel were reached, after a most pleasant opening day, by about seven o'clock.

Tuesday was devoted to Cottingham and Beverley, where, of course, the churches and Minster far outstrip those above noticed for importance and fine architecture; but we have described the smaller works more at length because they are less known, and little likely elsewhere to be described, while the more conspicuous churches of Cottingham and Beverley are constantly being visited by the student. Leaving Hull by the half-past nine train, the beautiful church of Cottingham, with its fine central tower was reached in a few minutes. The building is of Decorated character, and consists of nave with aisles and chancel. The transepts are of the same length as the arch only. The central tower arches have been strengthened at an early date. The windows are defective in the aisles, being badly managed copies of those in the west front, which is unusually good. The base mould of the west front is carried round the arch of the west door in an angular way, not without a pleasing result. The church has been restored and so has the fine cross to Nicholas de Luda (Louth), rector and builder of the chancel in 1374. The nave is of fine bays, with no clerestory. The old roof remains, and is covered with the original lead. The central tower is about 30ft. square. The belfry stage is very rich, but the angle buttresses on the angles are wiry and poor. The boldly-treated stair turret on the N.E. corner contracts the space to such an extent that two-light windows are inserted on either side, instead of the three-light windows which occupy the remaining faces. This arrangement is very curious. The church is charmingly situated, and some good sketches were made during the hour which remained after the description of the church by Mr. Fowler. On reaching Beverley the church of St. Mary was at once visited, passing the picturesque market-square on the way. The view of the square, with St. Mary's tower in the rear, would make a fine subject for a water-colour sketch. St. Mary's is a splendid example, almost rivalling the Minster itself in interest, of Decorated character chiefly, although it contains work of earlier character. The building has been completely and beautifully restored by the late Sir Geo. Gilbert Scott, R.A., who also restored the Minster. Mr. Fowler described the building, in a brief manner pointing out the architectural features, and referring to Pugin's work on the west front and south transept. The stonework, by the bye, of Pugin's work has very much perished, and in some parts will soon itself require restoration. After some good hard sketching and a visit to the North Bar, a curious if not beautiful example of brickwork, a substantial lunch was obtained at the hospitable Beverley Arms. The Minster was then reached, and practically though briefly described by the leader of the party, which now comprised several local archæologists. The singular treatment of the piers of the eastern transepts was the subject of some discussion, and on visiting the roof an arcade was noticed over the groining at the crossing above the piers which no way helped the solving of the problem. The nave roof is peculiar as having no purlins or plate, the boarding under the lead being apparently the only connecting bond between the principals. The beautiful east window of old glass was much admired, but regret was expressed that no provision has been yet taken to shield or protect it inside or out. The modern screen-work is of much beauty, and is unusually well executed, and does Mr. Elwell, of Beverley, whose work it is, much credit. He has caught the spirit of the work in carrying out Sir Gilbert's design. After a most instructive day a return by train was made to Kingston-upon-Hull.

M. B. A.

METROPOLITAN BOARD OF WORKS.

THE board, at its meeting on Friday, received an influential deputation from the directors of the Metropolitan and Metropolitan District railways as to the board's promise of a subsidy towards the completion of the "Inner Circle." Mr. Forbes, general manager of the District line, explained that the original scheme by an independent company for constructing a line from the Mansion House terminus to the Metropolitan Railway near Bishopsgate station had failed to meet with pecuniary support; the two companies concerned proposed to carry out a joint line on a route recommended by Sir John Hawkshaw, C.E., passing considerably to the southward of the original scheme, and close to the Docks, Custom House, and suggested Tower Bridge. It was, therefore, asked that the Board of Works would transfer the subsidy of £270,000, originally furnished towards the formation of a new street from Mansion House terminus to Fenchurch-street, to the two companies concerned, as an equivalent for widening Eastcheap and Tower-street to 60ft., and forming a new one of same width to Trinity-square. The memorial was referred to the works committee; as was also a letter from Mr. C. W. Wallis as to schemes of (1) an overground railway connecting the Fenchurch-street and Cannon-street stations; (2) a cart way from Upper Thames-street to Mincing-lane in a line with the new open street, Hart-street, and Crutchedfriars; (3) a new open street between Mincing-lane and Mark-lane; (4) the completion of the Inner Circle Railway from the Mansion House station to Aldgate.—A letter from the Westminster District Board, stating—with reference to the widening of New Pye-street and Perkins' Rents, in connection with the Old Pye-street scheme under the Artisans' Dwellings Act—that they are prepared to effect certain street improvements in connection with the scheme, provided that the board will contribute half the cost, was referred to the engineer, the solicitor, and the superintending architect. The tender of Messrs. Hook and Oldrey was accepted at £5,653 for the erection of an additional story to the offices of the board. It was reported by the works committee that Mrs. Pearson, whose tender for the construction of a sewer from Clapham-road to Dragmire-lane was recently accepted, had not commenced the work within the required time; it was, therefore, determined to annul the contract with Mrs. Pearson, to accept the next lowest, that of Messrs. Williams and Co., the solicitor being instructed to inform Mrs. Pearson that the board will hold her responsible for any additional cost they may incur in consequence of her failure to carry out the contract. The following contributions, being one-half the estimated cost in each improvement, were voted to metropolitan local authorities:—£2,276 to Lewisham district board towards bridge widening and road improvement at Sydenham station of London, Brighton, and South Coast railway; £371 to Chelsea vestry, towards setting back the frontage of Elm-park and widening Fulham-road for 630ft.; £256 to Chelsea vestry, towards widening Riley-street; £150 to St. Giles's vestry towards converting the disused burial board of St. Giles-in-the-Fields into a public garden. It was agreed to advance the guardians of Islington the further sum of £8,000 towards new workhouse, and sanction was given to the borrowing by Greenwich district board of £550 for the erection of buildings on their wharf at Greenwich. With reference to the bill promoted by the board for amending the Metropolis Management and Building Acts, it was reported that it had received the royal assent. With reference, therefore, to those provisions of the Act to which immediate effect can be given—being sections 6, 7, 8, 9, and 10, which deal with the width of thoroughfares—the clerk was instructed to address to each vestry and district board in the metropolis, and also to each district surveyor, a letter requesting them to report to the superintending architect any case in their district in which it seems that the provisions of the Act contained in the above-mentioned sections are being violated. It was stated that the sections of the Act relating to the materials and height of houses could not be put into force till bye-laws had been sanctioned by the Home Secretary; these were now being prepared by the Building Act committee and the officials of the board. Mr. Leslie brought before the board the neglected condition of York-buildings Water-gate, and urged that this would be a favourable opportunity for raising it by means of hydraulic jacks to a level with Buckingham-street, so affording an additional access to the Embankment-gardens. He read the paragraph concerning the gate which appeared in the Office Table column of the BUILDING NEWS that day (p. 148), and concluded by moving—"That, in the opinion of this board, it is desirable to make an additional entrance into the board's beautiful garden east of Villiers-street by raising the York-buildings water-gate to the level of Buckingham-street, and so utilising that ancient work, provided that the whole expenditure do not exceed £500." Mr. Richardson seconded the motion, but said there were almost insurmountable difficulties in the way of carrying it out. The gate was claimed by a gentleman of a peculiarly litigious disposition (Dr. Duncan), who had claimed £5,000 for it. Although it was doubtful if the gate was designed by Inigo Jones, it was very desirable that the gate should be set up, and utilised as an entrance to the gardens. Mr. Lloyd objected to the proposal, as the board was one of works and not decorations. He moved the previous question. Mr. Cox spoke of previous litigation as to the gate. On a division being taken 8 voted for the previous question, and 9 for Mr. Leslie's motion, but a further amendment, proposed by Mr. Selway, referring the whole subject to the works committee, was ultimately adopted.

ARCHITECTS NOWHERE NOWADAYS.

MR. J. P. SEDDON has a readable letter in the *Ecclesiastical Art Review* for August (a very good number), in reply to a correspondent who dealt in the previous number with the "circumstances that control architects," declaring that the architect nowadays "is but an accessory for the most part—a sort of valet of modern luxury, and the hierophant of a weekly sanctimoniousness. At times he is the football of committees, or the weathercock of stormy clients; and again, when he has a little gift of freedom, he is a sort of phonograph, unwinding dead voices for a commission."

Mr. Seddon admits that "architects, after all, are mortal. As is the demand, so is and will be the supply. Architects are, and should be, the servants, not masters, of the public. They may and should be servants with self-respect and dignity; but it is not their part to drag unwilling employers whither they would not. It is the committees and stormy clients that most need reform. The wind must set steadily from a right quarter, and not the weathercock stick fast on its pivot. Granting the above to be the state of the architect of this time, I contend that, though we may and should make his improvement the object of our reformers, it is more to the purpose to endeavour to raise the general taste of the country. When the mention of art ceases to raise scornful merriment in the House of Commons; when it shall become a disgrace at our Universities to be ignorant of its first principles; when the public learns to discern between good work and bad, between true work and false, and not to prefer the latter to the former, then, indeed, will there be some hope for the young architects your correspondent is so anxious to improve. Till then, I fear, it may be misleading to tell them that 'the field is wide, that the rewards for their exertions will be great, and that the results will be enduring.' Rather, seeing how little many good men now among us are appreciated, and how far more successful is claptrap, bid them work for the work's sake, without too keen a hope for tangible reward. Let them realise the hard struggle necessarily before them, and brace themselves for a life-long vigorous kicking against pricks for the sake of the exercise and its morally, instead of materially, beneficial results."

The Court of Common Council has resolved to expend £205 in supplying the members of the Court with medallions of Temple Bar, formed from the lead of the roof of the structure.

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ILLUSTRATIONS.

HOUSE AT BRIGHTON—SHOP AT THE CORNER OF CORNHILL AND GRACECHURCH-STREET—MR. CLUTTON'S DESIGN FOR THE ORATORY CHURCH, BROMPTON—HEREFORD CATHEDRAL.

OUR LITHOGRAPHIC ILLUSTRATIONS.

MR. CLUTTON'S DESIGN FOR THE ORATORY CHURCH, BROMPTON.

We complete the series of illustrations of Mr. Clutton's design with the front elevation. The longitudinal section and side elevation, together with a full description, were given in our last number.

HEREFORD CATHEDRAL — IMAGINARY REPRODUCTION OF WEST FRONT.

We can unfortunately give no description of this illustration. Had its author been still amongst us we should probably have been able to supplement it with his own statement of the reasons for believing it to be a reproduction of the ancient work. We can only again refer our readers to his paper on the subject, read last year at Hereford, and reported by us in our issue of Aug. 10, 1877 (page 137, Vol. XXXIII).

SHOP, CORNER OF GRACECHURCH-STREET AND CORNHILL.

We illustrate this week a small shop-front which has lately been completed at the corner of Gracechurch-street and Cornhill, for Mrs. White, the jeweller. The front has been specially designed so as to suit the purposes of the particular trade for which it is used, in which the lower portion of the window space is only practically of real value. The upper part of the front has, therefore, been filled with ornamental glass, which adds to the general effect. The whole of the shop has been fitted up in character with the front, from the designs and under the superintendence of Mr. Robert W. Edis, F.S.A., architect, of Fitzroy-square. At present the corner front is only completed, but the drawing shows a small additional frontage in Gracechurch-street, which it was proposed at one time to include.

HOUSE IN THE THIRD AVENUE OF THE WEST BRIGHTON ESTATE.

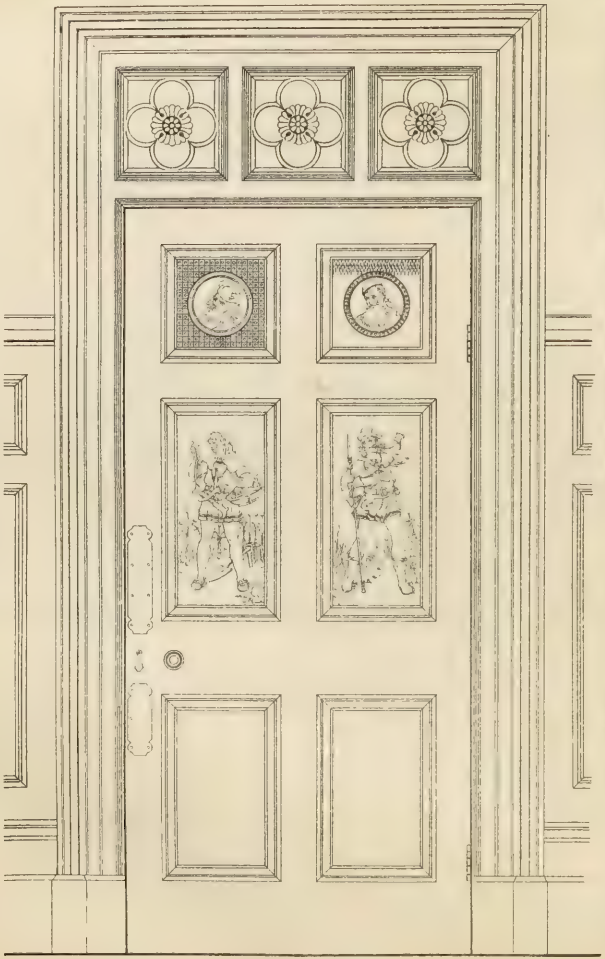
This building, which we favourably noticed in our review of building works on the estate some time since, is just completed, from the designs and under the superintendence of Mr. W. Galsworthy Davie, architect, of 21, King William-street, Strand. It is situated near the sea, good views of which are obtained from the principal rooms. The loggia shown in the drawing and a covered balcony at the back are pleasing features. Its architecture attracts attention to it from among the surrounding buildings. The style adopted is Gothic, freely treated, to meet the modern requirements of plate glass and sash windows, &c. The regulations of the estate preclude the use of much external colour — Benham white facing bricks are used throughout for the walling, producing a cold monotony very much to be regretted; but this has been in a great measure overcome in the present case by a free use of warm buff terra cotta for the dressings and decorative parts, with shafts of red to loggia and first floor window, red chequers in gables and polished red granite shafts at the entrance. The details, especially those of loggia, and frames under first floor windows have been freely adapted from Mr. Davies' studies in France. Internally the whole of the fittings and details have been specially designed. The porch has two Shakespearian subjects, executed in sgraffito, above which runs a frieze of blue and white painted tiles. The ceilings of porch, halls, and dining-room are panelled by means of wood ribs laid on the plaster. The porch and hall floors are laid with the Campbell Brick and Tile Co.'s tiles. The dining-room is panelled to about 6ft. in height, and, in place of the usual cornice, has a frieze of painted tiles in blue on a buff ground. The fireplace is arranged for a dog grate, the hearth and jambs having Godwin's antique encaustic tiles—the latter being surrounded with inlaid Devonshire marble, outside which is a wainscot and walnut chimney-piece, with turned shafts traceried panels, bevelled plate, &c., carried up to the tile frieze the full width of chimney breast. Directly outside the servants' door to this room is a serving lobby in close proximity to the butler's pantry and servants' stairs. From reference to the plan it will be seen that nothing need pass through the hall from kitchen to dining-room. This is a most desirable arrangement, and where funds will permit of its being carried out should never be neglected. The drawing-room has a fireplace composed of wainscot and mahogany enriched by carving and ornament in gold, richly inlaid marble and painted tiles in pleasing colours by the Campbell Brick and Tile Company, representing music. The library fireplace is of red terra cotta, relieved with gold-painted tiles and wainscot framework. The remaining fireplaces in the principal rooms are composed of marble or terra cotta, with wooden framework and painted tiles in jambs, the greater part of them being Dutch. The staircase with turned newels and balusters has come in for a fair share of attention, and is both light and spacious. The mullioned windows are filled with stained glass throughout, but not so as to unduly obstruct the light. They include four panels representing day, night, morning, and evening, upon a slightly-tinted ground, diapered with small quarries of ships, sea-nymphs, &c., surrounded with coloured borders and interspersed with small pieces of bright colour. The porch screen and inner doors have stained glass of simple but pleasing design. The door panels on the ground floor, a selection of which we give, have been decorated in colour in a somewhat novel and effective manner. In addition to those we publish the following subjects occur — viz., the Sciences, Literature, Fishing, and Cooking, also conventionalised foliage. The basement, a great part of which is paved with tiles from the Architectural Pottery Company, contains ample accommodation for the usual requirements of a well-appointed household. Special attention has been given to sanitation and ventilation. Lanyon's patent apparatus is used for ventilating the kitchen and heating the hall. Hot water is laid on throughout the house. The soil pipe is ventilated by means of Buchan's trap at the bottom, and an extracting cowl at the top, above roof. No D trap is used, but an S trap has been put to each w.c., thus preventing the back draught which would otherwise now and then occur. All pipes communicating with the inside of house are cut off from the drains on the outside. Messrs. W. T. Allen and Co. supplied the iron gates and railing. Messrs. Hyde Bros. and Cook, of Worthing, have been the builders.

THE NEW LAW COURTS.

The Society of Engineers visited the New Law Courts on Wednesday, and were shown over the buildings by Mr. William Bartholomew, one of the chief draughtsmen. There is not much fresh to note since the visit of the Institute of Architects during the conference week (see page 584, last Vol., published June 7th, and also page 519, May 24th). Some progress has been made in glazing, flooring, and stove-fixing, &c., in the eastern block. The walls of the great central hall are now carried as high as the heads of the chief arches on either side, and the groining for the vaulted corridors enclosing this hall is set, and the centring erected. While pacing the extremely thick walls of the central hall it was easy to follow the cellular lines of the eighteen courts, disposed in pairs on either side of the spiral staircases. The arrangement of these courts, and of the separating open areas, have, we believe, been somewhat altered as the work has proceeded. The dimensions do not seem large; the most spacious, the Vice-Chancellor's appeal court, is but 40ft. square. The internal walls of the northern block are now carried to a height of about 40ft., and the corridors and bar-robing and refreshment-rooms are being constructed above these, and also over the courts will be two other stories. Recurring to the nearly completed block, that next Bell-yard, we note that since our last visit much external carving of a vigorous character has been added to capitals, mullions, and other points. The flooring is on Dennett's principle. Upon the concrete vaulting and its embedded girders are laid sleepers, and across these bearings are numerous single joisting of slight scantling, the boarding surface being of oak for the judges' and other principal rooms, and of deal for subordinate positions. A peculiar feature in the galleries is the use of a small double baluster. This detail is also being used externally near the western angle of the buildings. The chief fireplaces (all open) are surrounded with a course of encaustic tiling, the head of the chimneypiece being decorated with a band of spirited carving. Each of these are differently treated. Galton's stoves are used throughout. The lavatories and w.c.'s are well lighted from the rear, and lined internally with Cliff and Son's white glazed bricks; the fittings, now in course of erection, are all from Jennings' sanitary works. The ingenious way in which the difference in levels between the north and south fronts has been met by the architect elicited approval from many of the visitors. About 1,500 men are employed on the works by the contractors, Messrs. Bull and Sons, at the present time, and it was stated that the work will probably be completed in about two years. A series of narrow-gauge tramways cross the area in every direction, and at various elevations, for convenience in transport of materials, the hoisting from one level to another being accomplished by derricks and lifts. The operation of the stone-cutting machinery on the west side of the area was watched with interest. A series of powerful saws cut the material, chiefly Portland, into the required thicknesses, and the surfaces are rubbed true upon a gigantic wheel. The most intricate mouldings are cut upon the straight by bringing the arrise of the block of stone against a revolving shaft, upon which are fixed movable arms, bearing specially-designed nails; these press head-foremost upon the stone, and cause the desired indentations, which have, however, afterwards to be touched up by hand. It is obvious that this expeditious process of moulding-formation is useless for curved surfaces, and these are manually carved. Between 400 and 500 masons are at work here, of whom 140 are employed in a shed separated by the steam-driven machinery from the general body of workmen. These isolated workers are the foreigners who came in at the time of the masons' strike, and have since been kept on. They are principally Germans, with a few Italians. We are informed that they have laboured well and continuously, but that their work is not equal in character to that of the men in the larger shed. The whole of the hands are paid by time, no piecework being given out. The visitors also examined the two great boilers, Annan's patent, and the pair of horizontal engines by which the whole of the stone-cutting machinery is driven. The visit was concluded with a clamber by staircase and rough ladder to the balcony at the summit of the south-east tower, opposite Temple Bar, whence was obtained an excellent bird's-eye view of the Law Courts' area, and, indeed, over the south, south-east, and south-west portions of the metropolis, the prospect being bounded, at half-a-dozen miles distance, by the Surrey and Kent hills.

The parish church of Burnham, Somersetshire, has been reopened, after restoration, under the care of Mr. Ewan Christian. Messrs. Merrick and Son, of Glastonbury, were the builders.

Photo Lithographed & Printed by James Akerman 6 Queen Square, W.C.



Dining Room Door

Drawing Room

Dining Room

· DECORATION · OF · DOOR · PANELS ·

Business Room

Servants' Door to Hall

Dining Room

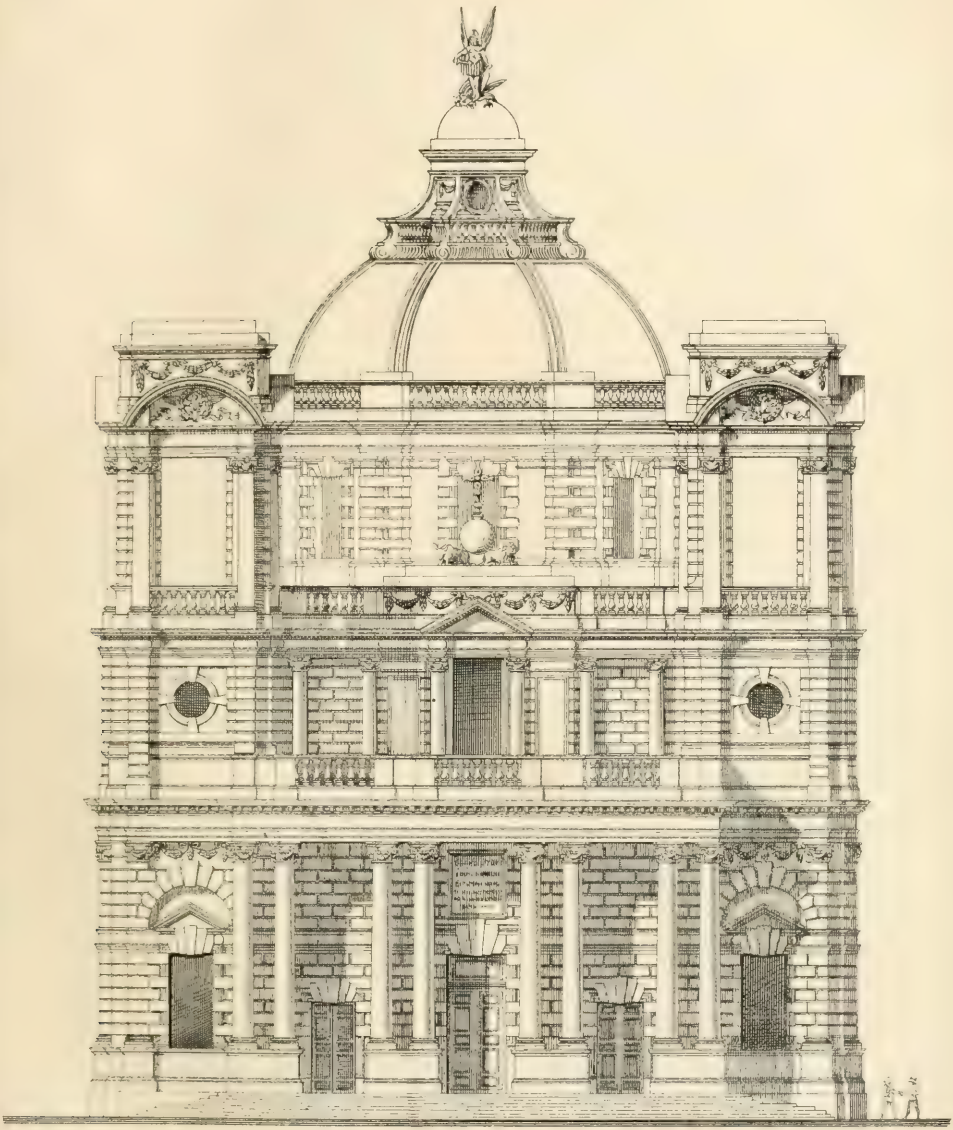
Alexander Photo-lith London

· HOUSE · IN · THE · THIRD · AVENUE · OF · THE · WEST · BRIGHTON · ESTATE · BRIGHTON · W · GALSWORTHY · DAVIE · *Architect* ·

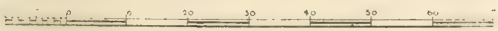
Photo-Lithographed & Printed by Chas. Harriman 6 Queen Square W.C.

Mr H CLUTTON'S DESIGN

"JANUA COELI"



FRONT ELEVATION



PROPOSED NEW CHURCH OF THE ORATORY BROMPTON S.W.

THE ROOF OF ST. ALBAN'S ABBEY.

THE vexed question of the proposed new roof of St. Alban's Abbey was further considered last week by a meeting held on Saturday, at St. Alban's, of subscribers of £100 and upwards to the restoration fund, the Bishop of the diocese presiding.

Sir Edmund Beckett proposed the following resolution:—"That the roof of the nave having become ruinous, it is desirable to restore it to the original pitch indicated on the tower, keeping as much of the pointed and panelled ceiling as may be in a sound condition, restoring the rest in similar style." The important question, he said, was whether they could repair the roof in the ordinary sense of the term, or whether it must be rebuilt. That might be a question, but he was not the only person who had pronounced the roof to be ruinous. Forty years since Professor Donaldson had forewarned the authorities that the girders were in so rotten a condition that it would necessitate before long an entirely new roof. Girders did not generally improve by keeping for forty years. He had a letter also from the contractor, Mr. Longmire, asserting that he had told Archdeacon Grant, in the presence of another clergyman, that a new roof must be put on, the old one being found so rotten that any attempt to repair it would involve unknown expense. (Archdeacon Grant objected that Mr. Longmire was not an authority.) He contended that Mr. Longmire had as great experience in such matters as any man, and his judgment was most satisfactory, as was proved by his saving the committee from a tremendous mistake in the matter which he had no interest in preventing. Sir Gilbert Scott had unfortunately died before the full examination (made on Mr. Longmire's suggestion) had been completed; but his son had since made an estimate of what was needed for repairs, the expense of which it was well known could never be accurately estimated or known until the work was done. A list of the substitutions necessary for the estimated repairs was read, and the honourable gentleman said that if that course were adopted not a single square foot of the present roof or ceiling would be seen again after the repairs were completed. The lowest estimate for those purely conjectural repairs that could be made was £3,138; but no one would estimate to do the work for that sum, because until it was undertaken no one could know what the expense would be. He would further observe that the present ceiling might be as well replaced with a high-pitch roof as a low one. Some of those who had engaged in this discussion seemed to think that he was advocating an open interior roof, but nothing was farther from his idea, an open roof being, for many reasons, utterly absurd. If the existing roof had been reparable he should never have thought of a high-pitch roof, but held that it was hopelessly decayed, and that a new roof must be put on, and that it should be like the original roof. Knowing what was the proper thing to do mechanically, he would suggest that the new roof should be of the original pitch, and that it should be of Memel timber covered with Cumberland slates, instead of oak and lead. Memel pine was a more suitable timber for roofs than oak, while Cumberland slates were almost as picturesque as the ancient lead, and more durable than the modern metal, which, being "de-silvered" in the process of manufacture, had lost all that had recommended it in point of appearance, and was now so readily attacked by the atmosphere that he had known modern repairs after twenty years' exposure to be in a worse condition than ancient leads 400 and 500 years old. The tender—not merely an estimate—for the proposed new high-pitch roof was £3,900.

Mr. Evans proposed the following amendment:—"That this meeting recognises the propriety of the late Sir Gilbert Scott's desire to preserve the old roof of the nave as an interesting portion of the abbey, and inasmuch as it appears from the architect's report that this roof can be rendered perfectly good and serviceable, recommends that it be repaired accordingly." He quoted from a report of Mr. Scott, son of the late Sir Gilbert Scott, dated June 25, who stated that his father's object was twofold—to preserve the old roof as an interesting portion of the abbey, and to render it sound and serviceable, and then went on to specify what in his opinion was needed to accomplish this object. The speaker then argued that the present roof went back to the early part of the fourteenth century, that its pitch was suited to the abbey, and that the suggested alteration would not harmonise with the building in other parts without much more being done.

Mr. Scott said that his father had never discussed the question with him; but he had no doubt his opinion would have been in favour of a high-pitch roof if the matter had been brought definitely before him, seeing that he had put a high-pitch over a low-pitch roof at Selby, and desired to do the same at Rochester. He did not think the present roof was past repair, but it would cost £3,000 to make a complete job. He endorsed for a new roof the use of Memel timber, but preferred lead as more dignified in appearance.

Archdeacon Grant then spoke at some length, arguing strongly in favour of the retention of the old roof by adequate repairs. Several other gentlemen took part in the debate, and finally the chairman submitted the amendment to the meeting, by show of hands, seven voting in its favour and fifteen against. The original motion was then put, and carried by fifteen to five.

There is, at any rate, not much doubt about the opinion of those most concerned in the matter about the proposed change.

BARNACK CHURCH.*

THE remarkable western tower of this church is the only remnant of a singularly lofty Saxon church, replaced, probably late in the 12th century by another, notable for its light and graceful proportions. This tower, to the commencement of the Early English belfry and spire, bears traces of having been, in remote ages, a place of resort in times of danger; it has two higher stories, once lighted by two windows on each side, of which sufficient traces are visible; the lower part was a place of assembly, perhaps even of judicature. It was not until the removal of more than 2ft. of débris, which we have proof had been undisturbed from before the 13th century, that the seat in the western niche, the stone rises on three sides, and the plaster continued to floor line, revealed the fact that a president and some twenty or thirty persons had accommodation for sitting in this ancient court. In the window in the west face of this tower the writer has ventured to represent a king of Mercia presiding over a trial by ordeal. As to the architecture of this most ancient portion of the church, the description "petrified carpentry," applied to it by a lately deceased author, is felicitous and graphic. The representations of projecting beam ends, and of tenon-and-mortice construction, exhibit a fondness in the builders for more primitive materials, and an ignorance of a style more appropriated to the noble material so abundant in neighbouring fields. The Barnack ragstone quarries, not unknown to the Romans, extended over 130 acres here, and were exhausted during the fifteenth century. The date of disuse of this stone is shown in the construction of Walcot Hall Chapel in this church, and in the eastern chapel of the five altars at Peterborough Cathedral. As to the probable antiquity of this church, the researches of an historian who has carefully studied Anglo-Saxon literature show that large property in this neighbourhood was possessed by Beornec, founder of the line of princes who reigned over the province of Bernicia. As the original name of the parish is Bernek, the probability is that the site of the property was here. The same author states that Alhfrith, eleventh in descent from Beornec, gave lands of ten tributaries near Stanford to St. Wilfred, who is believed to have built a monastery here. The patron saint of King Alhfrith was John the Baptist; those to whom St. Wilfred dedicated his churches were St. Peter and St. Andrew. Barnack Church is dedicated to St. John the Baptist; but it has on the scroll-work panels on the tower three carvings of birds—the cock of Peter, the dove of John the Baptist, and the eagle of John the Evangelist. Other points of resemblance exist between this tower and that of churches in the north of England of Wilfred's building. The date thus claimed for the foundation of Barnack Church is between A.D. 660 and 740. It is my intention to replace the worn-out curtain on the east side of the church by a series of mosaics, by Salviati (now in the Paris Exhibition), representing angel figures, after Fra Angelico, and at an early date there will be substituted for the ceiling over the north aisle a suitable wooden roof.

* Abstract of a paper read before the members of the Royal Archæological Institute by the Rev. Canon Argles, August 5, 1878 (see pp. 128-9 *ante*).

SCIENCE AND ART TEACHING.

THE 25th report of the Science and Art Department of the Committee of Council on Education has been issued. It shows that the number of persons who have, during the year 1877, attended the schools and classes of science and art in connection with the Department, are as follows, viz.:—55,927 attending science schools and classes in 1877, as against 57,988 in 1876, and 610,620 receiving instruction in art, showing an increase upon the previous year of 80,208, or more than 15 per cent. At the Royal School of Mines there were 38 regular and 181 occasional students; at the Royal College of Chemistry, 282 students; at the Metallurgical Laboratory, 73. At the Royal College of Science for Ireland there were 21 associate or regular students and 45 occasional students. The lectures delivered in the lecture theatre of the South Kensington Museum were attended by 8,481 persons. The evening lectures to working men at the Royal School of Mines were attended by 1,227 persons; and 172 science teachers attended the special courses of lectures provided for their instruction in the new Science Schools at South Kensington. The various courses of lectures delivered in connection with the Department in Dublin were attended by about 4,300 persons. The total number of persons, therefore, who received direct instruction as students, or by means of lectures, in connection with the Science and Art Department in 1877, is 681,367, showing an increase, as compared with the number in the previous year, of 81,199, or more than 13½ per cent. The attendance at the Art and Educational Libraries at South Kensington continues to increase; with that at the library of the Royal Dublin Society the number of readers in 1877 has been 74,333. The museums and collections under the superintendence of the Department in London, Dublin, and Edinburgh, were last year visited by 2,548,766 persons, showing a decrease of 440,281 on the number in 1876. The returns received of the number of visitors at the Local Art and Industrial Exhibitions, to which objects were contributed from the South Kensington Museum, show an attendance of 1,031,506. The total number of persons who during the year 1877 attended the different institutions and exhibitions in connection with the Department has been upwards of 4,261,639. This total, compared with that of the previous year, presents a decrease of 315,738. The expenditure of the Department during the financial year, 1877-78, exclusive of the vote for the Geological Survey, amounted to £276,416 5s. 4d.

RAINFALL, AND HOW TO ESTIMATE IT.

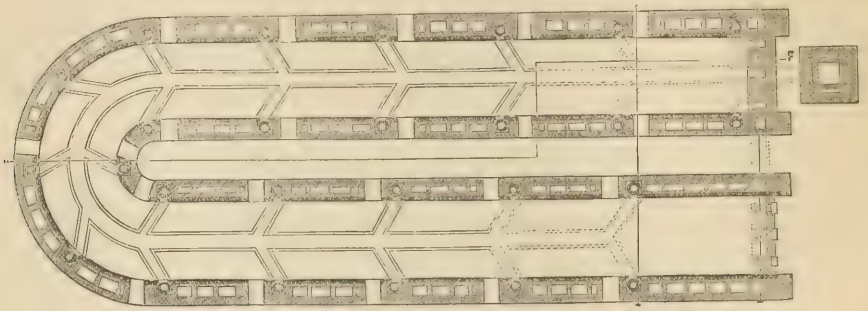
TO ascertain the drainage area of a district, or the area within which the rainfall may be utilised, it is necessary only to make a survey or to obtain simply one of the Ordnance maps in which the summit-level of the ridges surrounding the valley may be traced. The basin so circumscribed is termed the "catchment basin." Thus, Manchester Waterworks has a catchment basin of 19,000 acres. Rainfall varies considerably; the fall in Essex is about 20in., while in Keswick, Cumberland, it is said to be 67·5in., and in another part of the Lake district as much as 180in. to 200in. These last figures are quite exceptional. For England a mean of 30in. annually has been given, but it is to be recollected that the fall along the western coast is considerably more.

In Sir W. Fairbairn's recent "Treatise on Mills," some useful data are given respecting the means of estimating rainfall and storage capacity. To estimate the quantity of rain which

falls upon a given catchment basin in the course of a year, it is simply necessary to place two or three rain-gauges at different elevations round the site of a proposed reservoir. By examining them at intervals of a week or month, the average quantity can be determined, allowing for a certain loss by absorption and evaporation. One very necessary precaution is to place the gauges within 5in. or 1ft. of the ground, as the quantity of rain rapidly decreases at slight elevations from the ground. They should be placed also out of the way of artificial currents of air, like those created by the slope of a hill or roof of a house. From some observations made by Mr. J. F. Bateman and a committee of the Manchester Philosophical Society, it was found that gauges placed on the ridges of roofs did not collect half the rainfall that fell on the ground. Thus, the gauges placed on the ground showed an excess of 50 per cent. in some cases over those placed on the ridges, and the difference is accounted for chiefly by the upward currents of wind created by the sloping sides of the roofs, which carried the raindrops over the gauge. Sir J. F. W. Herschel also hints that the raindrops are larger in the moist lower strata of the atmosphere. Dr. Heberden found the annual fall at the top of Westminster Abbey to be 12·099in., on the top of a house close by of inferior altitude 18·139, and on the ground 22·608in. Mountainous districts are known to receive a larger quantity of rain than lowlands; but this fact must not be confounded with the decrease above mentioned—due probably to the lower temperature of the air, and the deposition of moisture on the raindrop as it descends. One inch in 24 hours is estimated as the maximum fall in England in average localities. A valuable table of results in Sir W. Fairbairn's treatise shows a loss by evaporation and absorption of from 12in. to 20in. Mr. Bateman, a high authority also, states from experience what the storage capacity should be to provide against seasons of drought. He says: "In the regions of comparatively moderate rain in this country the storage should vary from 20,000 or 30,000 to 50,000 or 60,000 cubic feet for each acre of collecting ground—the smaller quantity being about sufficient for an available rainfall of perhaps 18in., and the larger for one of about 36in. to 40in." The importance of reservoir storage in districts, especially where mills are built, cannot be over-estimated, and Sir W. Fairbairn describes in detail the Lough Island Reavy Reservoir, the embankments and regulating valves employed for its discharge. Mr. Bateman's valve is very ingenious for this purpose. It is divided into three parts: First, a small valve by which about $\frac{1}{10}$ of the area is opened; next, an intermediate valve of $\frac{1}{4}$ the whole area; and, lastly, the large valve. The small valve is drawn first, then the second and third follow as the water pressure is removed or becomes neutralised.

LANCASTER'S PATENT CONTINUOUS KILN.

THIS kiln, for burning bricks, tiles, pipes, lime, &c., is attracting some attention at the present time, principally from the undoubted saving it effects in fuel, and the facilities afforded for partial firing. The construction is shown in the plan given. It will be seen that the chambers are arranged in parallel lines, connected with each other by curved chambers at one end, the other end being left open and sufficient space or passage left between the rows or chambers, so that the materials are more readily conveyed from the machines or drying shed to each chamber in succession, without coming in contact with the persons engaged in discharging the materials from the outside, thereby giving greater facility for the supply and removal of the articles to and from the kilns. Arches of brick or other materials are thrown over the space between the two rows of kilns, at a sufficient height to allow the persons engaged in charging the kilns to work conveniently, and in the arches openings are left for admitting light and air. These arches require to be well built to support and counteract the outside battered walls of the two rows of kilns. A large central flue is provided under the kiln floor, which excludes all chance of external cold air entering and checking the draught. The branch flues are also large, and so constructed that they give greater facility for steaming the materials, especially in the curved chambers. Extra steaming flues are arranged for the external part of the two return chambers, which is a great advantage, so that the steam is more rapidly and easily carried away. In the top of all the chambers sufficient openings are arranged to admit fuel for the burning of the materials, and the dampers to the several flues are all worked from the top of the kiln, which enables the person in charge to attend to them without leaving his post to go below, except when he requires to turn the heat from one row of chambers to the other; he will then require to go down to the outside to regulate the end dampers. Five or more chambers can be built and worked at a considerable saving without completing the full set, the only disadvantage arising being the necessity to recommence firing at the last kiln each time, until the full set is complete. This will be a great advantage to small capitalists, who can then extend their kiln room to meet their requirements.



PLAN

THE BRITISH ASSOCIATION.

THE 48th meeting of the British Association was opened on Wednesday, at Dublin. The address of the president, Mr. William Spottiswoode, dealt almost entirely with mathematical science. From a full report in today's *English Mechanic and World of Science* we extract the following:—

MATHEMATICS AS A FINE ART.

The extensions of mathematical ideas would be overwhelming if they were not compensated by some simplifications in the processes actually employed. Of these aids to calculation I will mention only two—viz., symmetry of form, and mechanical appliances; or say mathematics as a fine art, and mathematics as a handicraft. And, first, as to symmetry of form. There are many passages of algebra in which long processes of calculation at the outset seem unavoidable. Results are often obtained in the first instance through a tangled maze of formulæ, where at best we can just make sure of our process step by step, without any general survey of the path which we have traversed, and still less of that which we have to pursue. But almost within our own generation a new method has been devised to clear this entanglement. More correctly speaking, the method is not new, for it is inherent in the processes of algebra itself, and instances of it, unnoticed perhaps or disregarded, are to be found cropping up throughout nearly all mathematical treatises. By Lagrange, and to some extent also by Gauss, among the older writers, the method of which I am speaking was recognised as a principle; but beside these perhaps no others can be named until a period within our own recollection. The method consists in symmetry of expression. In algebraical formulæ combinations of the quantities entering therein occur and recur; and by a suitable choice of these quantities the various combinations may be rendered symmetrical, and reduced to a few well-known types. This having been done, and one such combination having been calculated, the remainder, together with many of their results, can often be written down at once, without further calculations, by simple permutations of the letters. Symmetrical expressions, moreover, save as much time and trouble in reading as in writing. Instead of wading laboriously through a series of expressions which, although successively dependent, bear no outward resemblance to one another, we may read off symmetrical formulæ, of almost any length, at a glance. A page of such formulæ becomes a picture: known forms are seen in definite groupings; their relative positions, or perspective as it may be called, their very light and shadow, convey their meaning almost as much as through the artistic faculty as through any conscious ratiocinative process. Few principles have been more suggestive of extended ideas or of new views and relations than that of which I am now speaking. In order to pass from questions concerning plane figures to those which appertain to space, from conditions having few degrees of freedom to others which have many—in a word, from more restricted to less restricted problems—we have in many cases merely to add lines and columns to our array of letters or symbols already formed, and then read off pictorially the extended theorems.

THE SECTIONAL MEETINGS.

The sectional meetings opened yesterday. There was a *soirée* last night at the Royal Dublin Society, and a dinner and garden party at the Viceregal Lodge. To-day Mr. G. J. Romanes, F.L.S., is to deliver a lecture on "Animal Intelligence," and to-morrow will be devoted to excursions. On Monday Professor Dewar will deliver a discourse on "Dissociation; or, Modern Ideas of Chemical Action." On Tuesday, the 20th, there will be a *soirée* at the Royal Irish Academy, and the remainder of the week will be given to excursions. Those who only remember the Dublin of 1857, when the British Association was last in the city, will find a marked improvement in the architecture of the streets. The restored Cathedrals will attract strangers, Christ Church being by far the more beautiful, though smaller. In the Bank of Ireland may be visited the Irish House of Lords, which is unaltered, and is adorned with two old tapestries executed in Holland, and representing the Siege of Londonderry and the Battle of the Boyne. In the City Hall will be seen a fine statue of O'Connell by Hogan. In the Library of Trinity College visitors will examine the Book of Kells, and the palimpsests and codices. The harp of King Brian Boroihme is also here. The Dublin Corporation purpose exhibiting to the Association some of their records, which are very curious, and include the Great Charter which Henry III. granted in 1216, two years before Magna Charta. The now obscure streets, or courts, where Swift was born and Henry Grattan was reared, will no doubt be sought out by some who have not before been in Dublin. One of the most interesting trips near the city will be to the Ordnance Office in the Phœnix Park and the Observatory. In the Main Drainage and Utilisation of Sewage Section, the address of Mr. Edward Easton, C.E.,

is expected to be interesting to sanitarians. It will relate to the pollution of rivers, main drainage, and sewage utilisation. Thirteen papers will be read in this section.

COMPETITIONS.

Leek Fever Hospital.—Further disclosures as to the mode in which this competition has been conducted were made at the fortnightly meeting of the Leek Improvement Commissioners on Tuesday week. The clerk reported that the four selected plans for the fever hospital, ordered at the last meeting to be forwarded to the Local Government Board (see p. 104 in our issue of Aug. 2nd), had not yet been sent off; but that the central authority, in reply to a communication on the subject, had requested them to be sent up. Letters from competitors were read, protesting against the mode in which the competition had been conducted. The authors of "Sun and Air" said that whereas the surveyor to the commissioners had estimated their design to cost £2,500, they were ready to produce estimates from respectable builders guaranteeing execution for £1,700 (the stipulated sum). Messrs. Saville and Son, Argyle-square, W., wrote to "protest against such an unjust and disgraceful selection," and asking that a competent architect be called in as referee. Mr. William Huckvale also addressed the board, stating that the account in the Building News of the meeting was very unsatisfactory. It was proposed that all the 17 plans be submitted to the Board, together with the letters from competitors, but this was objected to on the ground that there would be a dead lock. Mr. Ward said "Epidemiology," the plan the commissioners had placed first, was without cross ventilation, and the water tank was put under ground. This competitor has sent an alternative plan to be placed on Mr. Carr's land—about which site no London architect could know anything. The conditions issued to competitors were vague and inaccurate, and could not be construed literally. The clerk was sharply cross-examined as to the facilities furnished to Mr. Taylor. He said Mr. Taylor's original sketch was not submitted to the Local Government Board, but admitted that they saw it, as well as the surveyor's plan, upon which latter pencil alterations were made. The surveyor's plan thus altered was not shown to the competitors. The following resolution was ultimately agreed to:—"That the four plans be sent to the Local Government Board with a letter stating that considerable difference of opinion exists as to the first plan being the best, and that if the Local Government Board approves, the remaining 13 sets of plans and particulars be forwarded to them with a copy of the advertisement."

Southampton.—Ten sets of designs have been sent in for competition for the boys' school about to be erected by the St. Mary Extra School Board, Southampton. The selection was made on Thursday week. Mr. W. H. Mitchell, of 8, Portland-street, Southampton, was the successful competitor. The design marked, "They have their exits and their entrances," which was considered next in merit, is by Mr. Arthur Martin, also of Portland-street, Southampton.

ARCHÆOLOGICAL & ARCHITECTURAL SOCIETIES.

The Leeds Architectural Association at Wakefield.—On Saturday last a party of members of the above Association visited Wakefield. On arriving there at 3.15 the members at once proceeded to the new Clayton Hospital, now approaching completion, and were met at the building by the architect, Mr. William Bakewell, who conducted them over the building, and explained the numerous features. Afterwards the members repaired to the new Town Hall, now in course of erection in Wood-street, from the designs of Mr. T. E. Collcutt. The association having been introduced to Mr. Webb, the clerk in charge of the works, by Mr. B. P. Shires, the hon. sec. of the visiting committee, the party proceeded under his guidance to a general inspection of the whole of the works. The next visit was to the parish church, and the members were highly pleased at seeing the satisfactory restoration which has, of recent years, been effected under the guidance of the late Sir G. G. Scott, R.A., at a cost of £23,000. It ranks 23rd on the list of the largest parish churches in the kingdom. Seven only have higher spires, while not one surpasses that at Wakefield for simplicity and beautiful proportion. The church consists of a nave and choir, with aisles of equal length, and tower at the west. The nave and choir were completed, mainly as they at present stand, about the year 1470, but the tower and spire in 1329, and fragments of two still earlier buildings of the eleventh and twelfth centuries have been discovered. Much of the original carved woodwork of the roof and choir fittings remains, and is of great interest. On the roof occur in several places the falcon and fetterlock badge of Edward IV., who, at the time of its erection, held the neighbouring castle of Sandal, before which his father was slain bravely fighting in the battle of Wakefield, A.D. 1460. The oak chancel screen, which is of Queen Caroline's time, is of exquisite workmanship, and is an interesting feature. The vicar gave the members the opportunity of inspecting the beautiful 16th-century altar vessels, which were arranged in the vestry. The chapel on the bridge was next visited, and brought the afternoon's visit to a close.

The Suffolk Institute and Essex Society of Archæologists held combined meetings on the western borders of the two counties on Thursday and Friday last. On the former day the decayed town of Clare was the meeting place, and here the embanked enclosure on the downs, supposed to be an early fortified camp, the great parish church of SS. Peter and Paul, and some newly-discovered sediliæ arcading at the priory, were the chief objects of interest. On Friday the round of visits was paid to a series of churches on the Essex side of the Stour, commencing with Bridgewell, a parish in which many discoveries of Roman remains have been made. In the church an address was given by Mr. C. Forster Hayward, F.R.I.B.A., of London, who described the building as a 15th-century building, with fine nave roof, of good carpentry and scientific construction, and chaste and simple work throughout, both in stone and wood. This suggested the inquiry, how was it there were so few monuments? for ordinary parishioners could not have put up such carved work. The roof ought to be repaired without loss of time, as the braces were thrusting out the wall above the clerestory windows. Many of the details throughout were unfinished, notably in corbels and in the font, only five out of eight of the sides of which were carved. Some conversation occurred as to the similarity of this church with those at Clare and Stoke, it being suggested that the groups were built by a guild of masons, who carried out the latest fashion imported from the Continent. At Steeple Bumpstead the church was found to possess a number of monuments of various dates, and in the village were seen numerous 14th and 15th century timbered houses, with characteristic carved barge-boards, and mouldings and spandrels to doors, and the gables, dormer windows, and grouped chimney stacks. After luncheon in the lime avenue of Bower Hall the hon. sec. of the Essex Society (Mr. King) read the annual report, which was satisfactory. The next annual meeting of the Essex Society will be held at Southend-on-Sea. Moyn's Hall, a fine specimen of the domestic architecture of the early years of Elizabeth, with numerous oriels, turrets, timbered gables, and clustered chimneys, was next visited, a collection of ancient title deeds and massive furniture being seen in the library. Stambourne Church, with its Early Norman tower and chancel arch, and Late Perpendicular south arcade and isle roof was described by Messrs. Hayward and Elliot, and a visit to Great Yeldham Church, a large and late building, with 16th-century piers, villainously carved in imitation of Decorated work, closed a long day's excursion.

Littleton-upon-Severn Church was reopened last week, after restoration at a cost of £1,100. Messrs. Pope and Paul, of Bristol, were the architects.

A new Baptist chapel was opened at Crick, near Belper, on Tuesday week. It is seated for 250 persons, and has cost, exclusive of land £1,600. The architect and builder is one of the deacons, Mr. Isaac Petts.

Building Intelligence.

Askern.—Memorial stones were laid of a new Wesleyan chapel, at Askern, near Doncaster, on Wednesday, the 8th inst. The new building, situate in the Station-road, will consist of a chapel 55ft. by 32ft., with gallery at one end, and rostrum at the other; and in the rear a schoolroom, two class-rooms, and vestry. The chapel will seat 380 adults; the chief schoolroom 100 children. The style is Early English. The chapel front will have wheel window over the main entrance, and at either angle octagonal buttresses, ending in pinnacles. The chapel roof is partly open, finished inside with transverse arches resting on columns, and carved corbels against the walls. The interior fittings will be of pitch-pine. The architect is Mr. John Wills, of Derby; the contractor, Mr. John Parry, of Castleford; the cost will be £1,400.

Avonwick.—A new chapel of ease has been opened at Avonwick, near South Brent, Devon. The building is a parallelogram, 63ft. × 21ft. 6in., with a class-room or vestry on the south side, and an open timber porch, and a small organ-chamber on the north side of the chancel. It will accommodate about 230 adults. The walls are built of local stone, with bands of red stone from Diptford, the chancel walls being built hollow, the windows of the chancel, weatherings of buttresses, &c., being of Hamhill stone. The building is warmed by one of Shillito and Shorland's Manchester school grates, which ventilates as well. The building has been erected by Messrs. Mills and Sons, of Newton Abbot; the reredos, screen, and choir seats being made by Mr. Harry Hems, of Paris-street, Exeter; and the whole has been carried out from the designs and under the superintendence of Mr. R. Medley Fulford, A.R.I.B.A., of the Close, Exeter.

Beer.—The new church of St. Michael, Beer, East Devon, was consecrated on Friday last. The building consists of a nave with north and south aisles, chancel, north and south transepts, two vestries, and a tower capped with a four-sided spire. The nave is 73ft. × 21ft. There is a clerestory with circular windows arranged in pairs over each arch, and an open roof of pitch pine. The height to the top of the wall-plate is 28ft., and to the ridge 46ft. The floor, where there are no seats, is paved with Godwin's tiles, arranged in varied patterns, and with increased richness of design in the chancel. The church will seat 660. The whole of the freestone work, and the ashlaring of the inside of the walls, is of Beer stone; the outside face is of a blue stone from different places. Messrs. Stephens and Bastow have carried out their contract in a very satisfactory manner. The carving has been executed by Mr. Harry Hems. Mr. Harris has acted as clerk of the works, and Mr. Hampton as the builders' foreman. Messrs. Hayward and Son, of Exeter, are the architects. The cost of the church will be about £7,000.

Belper.—The Pottery and High-street Board Schools were opened by the Belper School Board on Monday, the 5th. The former school is in three departments—that for 190 infants in the centre, with schools for 146 children on either side. Two sets of offices, lavatories, and asphalte-paved playground and sheds are provided—one for boys, the other for girls and infants. The High-street Schools have been transferred to the board from the trustees and altered, a large room being erected at a cost of £1,000, in which to hold board meetings. Messrs. Giles and Brookhouse, of Derby, were the architects for both schools. Mr. J. Glossop, of Ambergate, was the contractor for the High-street works, and Mr. J. Beresford, of Belper, for those at the Pottery.

Bridgwater.—The new cemetery for the parish of St. John the Baptist was consecrated on Friday last. The buildings, which have been erected from the plans and under the superintendence of Messrs. Edwin Down and Son, of Bridgwater, are in the Early Decorated style, and comprise two chapels, with vestries attached, and grouped so as to form one block of buildings. The walling is of red sandstone from adjoining quarries, relieved by Ham-hill stone dressings. The roof is open-timbered,

with curved braces in pitch pine, springing from moulded stone corbels, and is covered with Bridgwater plain tiles of a dun colour, surmounted by an ornamental red-tile ridge cresting. The seating is in pitch pine, and the floors of encaustic tiles, supplied by Messrs. Maw and Co. The windows are filled in with tinted cathedral glass in lead quarries, arranged in diamonds and squares. The contractor was Mr. James Kitch, of Bridgwater. An entrance lodge for the ground-keeper is now being erected.

PRESTON.—The extensive block of buildings at the bottom of Fishergate, erected during a twelvemonth past, as head-quarters and offices for the Lancashire County Police, is approaching completion. The elevation facing the main thoroughfare of the town is executed in brickwork, relieved by stone dressings. The front block comprises offices, work-rooms and stores, the magistrates' and head officials' apartments occupying the principal floor on the front. The court is on the first floor, and extends as a wing to the right, and at the rear of the main building. Behind are a spacious drill-yard, washhouses, offices, and residences. Mr. Littler, of Manchester, is the architect, Mr. John Walmsley, of Preston, the contractor, and Mr. Jos. Chappell the clerk of works.

RAVENSTHORPE. — After restoration the parish church of Ravensthorpe was re-opened on Friday, Aug. 2. The church consists of a nave, three bays in length, with north and south aisles, chancel, western tower, and south porch, and contains many features of interest. The north and south arcades and the tower appear to be 13th century work, but the clerestory of the nave is of a much later period. There is a good Early doorway on the south side, and in the south wall of the south aisle an arched recess, which some time, undoubtedly, was the tomb of a benefactor to the church. In the eastern pier of the south arcade the doorway to the old rood-loft still remains. The roofs of the nave and aisles have been entirely removed (excepting only a few pieces of old moulded timbers, which could be retained) and covered with lead. The tower, which was before shut off by a lath-and-plaster partition, has been thrown open to the church; the south porch has been entirely rebuilt; all the windows have been restored; the columns of the south arcade, which were in a dangerous condition, have been taken out and new bases inserted; the internal walls have been re-plastered; the floors and paving have been renewed; all the fine old carved oak benches have been preserved and re-fixed; entirely new oak seats have been provided for the chancel, and the pieces of the old screen have been re-fixed at the chancel arch. The works have been well executed by Mr. Gee, builder, of Daventry, under the direction of the architect, Mr. William Smith, of John-street, Adelphi, London.

SHAW.—The chancel which has just been added to the parish church of St. Mary, Shaw, was consecrated on Tuesday week. The edifice was rebuilt and enlarged in 1842, and the new chancel now erected is from a design of Mr. Butterfield, who has adopted the Decorated Gothic style, the material used being flint, with Bath stone facings. The floor of the chancel has been laid in encaustic tiles, the work of Messrs. Minton, Hollins, and Co., of Stoke-upon-Trent. The chancel is separated from the nave by a bold arch, and the church is enriched by a new pulpit. It has a base of stone, Devonshire marble in two colours, then walnut, above which is oak, fitted with brass pillars and wrought-iron tracery; then oak upon walnut, and is capped with walnut shelf. It has been executed by Mr. Norris, of Sunningdale. The expense of the improvements is estimated at £2,000.

WESTON-SUPER-MARE. — Thanksgiving services for the partial completion of the alterations in St. John's parish church were held last week. New seats and floor have been put into the church. A new pulpit and chancel screens have also been completed, as also the marble reredos. The chancel floor is laid with tiles and marble, and within the rails with oak parquetry. The decorations have been carried out, and are being completed, by Mr. Powell, of Bristol. The architects are Messrs. Hans Price and Wooler, and the builders, Messrs. Stevens and Gardiner, of Bristol. The hospital here has been completed, and will shortly be opened. There is now accommodation for 44 patients. The walls are built of local blue limestone and Coombe Down Bath stone. The cost of the last portion of the work has been £2,000. The work has been carried out from the drawings, and under the superintendence of, Messrs. Hans Price and Wooler, of Weston-super-Mare, and Mr. John Hansd, of the same town, was the builder.

CHIPS.

Premises in Bow-street, Scarborough, have been reconstructed and enlarged so as to serve as a mission and reading-rooms. The work has been carried out for the vicar of All Saints, Scarborough, by Mr. James Bland, contractor, Mr. Petch being architect.

The reconstruction of the Hotel de Ville in Paris, according to the report of the architect, M. Ballu, is proceeding in a most satisfactory manner. Nearly 200 workmen are employed upon the vast work. It is believed that by 1880 the whole of the exterior masonry may be finished.

The new parish church of Mount Hawke, Cornwall, was consecrated on Monday week. The style is Early English, and the building which consists of nave, chancel, vestry, and porch, is of local stone, with Bath stone dressings. The architect is Mr. A. C. Hancock, and the builders, Messrs. Langdon and Michell, all of St. Agnes.

The last touches are now being given to the work of restoration of the keep of the Duke of Burgundy's Tower in the Rue aux Ours, Paris. The staircase of this tower is of particular interest to archæologists. The stone column around which the steps wind is terminated in a capital of a block of stone, from which issues a representation of an oak tree, in the same material, the branches of which, covered with leaves very delicately carved, constitute the arches of a vaulted roof. According to tradition, the duke had the tower built after he had procured the assassination of the Duke of Orleans, and made it his principal residence in order to avoid a sudden attack.

The memorial stones of a new Wesleyan chapel at Borrowby, near Thirsk, were laid on Tuesday. The architect of the building, is Mr. W. Foggin, of Northallerton. It will be in the Gothic style, 41 feet long, by 22 feet wide, and the cost £450.

The third school which has been built by the Liversedge School Board was opened on Monday. It has been built from a design of Mr. William Ellis, architect to the board, and its cost is a little short of £5,000.

James Thompson, an architectural draughtsman, was charged on Wednesday and Thursday at the Mansion-house with stealing a variety of articles from shop doors in Cheapside. The prisoner stated that he saved the life of the present Earl of Beaconsfield, and the late Dowager Duchess of Kent 37 years ago. He was sentenced to six months' hard labour.

At a special meeting of the Lincoln Town Council on Wednesday, the contract of Messrs. Kellett and Bentley, of Wike, near Bradford, at £47,626, was accepted for the completion of the underground drainage of the city. The original contractor failed after partially completing the works.

In our description of the Prince of Wales's dining-room, Paris Exhibition, page 130 of last issue, the soffit of the ceiling is said to be "coppered and gilt;" it should be "coffered and gilt."

The Walsall Town Council has offered two premiums of 100 guineas each for the two best schemes for dealing with the sewerage of the town.

An animated debate occurred at a recent meeting of the Hastings Town Council on the vexed question of the site for the new town hall. By a majority of two it was resolved to erect the new municipal buildings on a piece of ground belonging to the town in Queen's-road, at a cost not to exceed £14,000 The plans prepared by Mr. Andrews, borough surveyor, were referred back to a committee for reconsideration. These provide on ground-floor a police-court, 50ft. by 30ft., approached from Queen's-road by a corridor, 10ft. wide; a jury-room, 26ft. by 18ft.; counsel's robing-room, 28ft. by 15ft. On first floor are a council chamber, 46ft. by 26ft.; committee-room, 29ft. by 18ft.; and surveyor's offices. The accommodation given on these plans is that originally proposed, with the exception of a large hall and fire-engine rooms.

The Church of St. Cuthbert, Great Salkeld, Cumberland, is undergoing restoration. Messrs. Hetherington and Oliver, of Carlisle, are superintending the works.

The restoration of the chancel of the parish church of Sutton Courtney was commenced last week. Mr. Ewan Christian, architect, Whitehall-place, London, Mr. A. Groves, contractor, Milton-under-Wychwood.

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TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.]

All letters should be addressed to the EDITOR, 31, TAVISTOCK-STREET, COVENT-GARDEN, W.C.

TO OUR READERS.—We shall feel obliged to any of our readers who will favour us with brief notes of works contemplated or in progress in the provinces.

Cheques and Post-office Orders to be made payable to J. PASSMORE EDWARDS.

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DRAWINGS RECEIVED.—J. W. S.—A. B. Plummer.—Smith and Heathcote.

C. A. WHEELER. (Such credentials as the original correspondent recommended would guard against such abuses.)—T. HEREFORD. (We should assign to the style known broadly as the Renaissance both the productions you name, rather than to the Queen Anne or Stuart. There are some actually Elizabethan features in the first instance—namely, the chimney-piece and sideboard, illustrated by us May 17th last. In both designs there is a mixture of Classical with English detail.)

Correspondence.

ST. HELEN'S AND ST. MARTIN'S CHURCH, BISHOPSGATE.

To the Editor of the BUILDING NEWS.

SIR,—Messrs. Wadmore and Baker appeal for funds for the restoration of the west doorway to the Nuns' Choir in this church, and assert, with regard to the restoration already carried out, that "an enumeration of what has already been done will attest that it has been carried out in a careful and discriminating manner."

As Messrs. Wadmore and Baker thus boldly challenge criticism it is well to point out that when the interior of the church was restored by them, between 1865 and 1868, the interesting Jacobean altar-piece and altar-rails were removed and replaced by what the historian of the church calls "a neat stone reredos," and rails of the usual art metal-work pattern-book design, the miserere seats removed and adapted, and the church generally stripped of everything that was not considered in harmony with its architecture.

Quite recently the very picturesque wooden pent over the west door of the south aisle, which formed a particularly agreeable feature, and was in all probability Wren's work, has been removed under Messrs. Wadmore and Baker's superintendence, and the doorway restored to what is, I suppose, assumed to be a becoming ecclesiastical condition.

It is also, I believe, in contemplation to take

down the belfry at the west end of the church, and to replace it by a belfry of a Gothic design —an act of vandalism which will, I trust, be averted by the prompt remonstrance of every one interested in the picturesque antiquities of our country. The rebuilding of this belfry has been openly advocated by the rector, who, in his sketch of the history of the church, affixed to Mr. Clodes' "Memorials of the Merchant Taylors' Company," expresses his regret that "Sir Thomas Gresham, whose body lies in the Nuns' Choir, did not leave sufficient instructions to the Mercers' Company, his trustees, to carry out his intention of erecting a lower spire instead of the unsightly turret which now exists." The opening of the west door is a small matter, but it may be that under guise of raising funds for the purpose, it is proposed to find the means to rebuild the belfry, and if this is the meaning of Messrs. Wadmore and Baker's "necessary and substantial reform," I for one must characterise it as a meddlesome and gratuitous interference.—I am, &c.,

JOHN HEBB.

Spring-gardens, S.W., August 13th, 1878.

MIDDLE-CLASS COTTAGE RESIDENCES.

SIR,—I read your article on the Middle-class Dwellings by Mr. Shaw, with interest, more especially in connection with the use of the material mentioned for the colonies. I regret, however, and very much, that more detail was not given in the treatment of the partition walls and fireplaces, and some explanation as to how Mr. Shaw, in the "But-and-Ben," manages to gather his flues under the roof, and also in the Middle-class cottages how he collects the flues from so many different places into the ridge of the end roof. I suspect that for this country it would be necessary to have the studs much thicker, and the slabs double, to withstand the intense cold. Hoping that subsequent numbers will contain more information in this respect—I am, &c.,

WALTER CHESTERTON, Architect.

Ottawa, Canada, August 2, 1878.

BODMIN TOWN HALL.

SIR,—I was unable to obtain another inspection of the plans, and the data I required for replying to "A Competitor's" further comments respecting the above, in time for your last week's issue. But having had an opportunity afforded me since, I will now do my best to oblige your correspondent, although I cannot undertake to indefinitely continue this correspondence, taking my catechising friend's questions seriatim:—

1. No engine-room was mentioned in the lithographed particulars supplied to the competitors by the town clerk, nor is it required by the town, since ample accommodation already exists at the market-house in Fore-street, where the fire engines are at present kept.

2. In the accepted design there is a retiring room opening out from the principal hall. An ordinary eye would have readily discovered it on the plans, as it measures about 16ft. square, and has a w.c. and lavatory *en suite*. This room is additional to the one mentioned by your correspondent.

3. In the report which accompanied the successful design, the author mentioned that the room which adjoined the town clerk's office could be used either as a second room for the town clerk, or as an additional committee-room, or for both combined. These two rooms being on the first floor, and occupying the front of the existing building, are in the best possible position for such purposes, whilst their floor space (about 600 square feet), is ample for the requirements of the town clerk's business in this borough.

I have also been favoured with a sight of the amended sketches, which are simply tracings from the original drawings, with a few trivial alterations in the staircase, the elevation, and in the position of a w.c. and doorway; not beyond what I assume is required in the case of almost every set of competitive drawings before they are carried out, and is quite admissible, provided the original leading idea and arrangement is adhered to, and the work of no other competitor touched upon, both of which conditions are strictly kept in the present instance. The fact that two other gentlemen of the town entered the room at the time when the inspection alluded to took place, will dispel any illusion that may have been created by the insinuation of "closed doors."

As an "old stager," but in another line, I will take the liberty, in conclusion, to commend to "A Competitor's" notice the very excellent advice that you, Sir, once gave to a talented architect now passed away—"To stick to his drawing-board rather than to controversy, if he would hope for better things in the future." Should your correspondent deem it expedient to follow this, I, for one, will wish him better luck next time, when, perhaps, it may be my privilege to defend him from the attacks of a disappointed competitor.—I am, &c.,

AN OUTSIDER.

Bodmin, August 12, 1878.

BODMIN TOWN HALL.

SIR,—Observing no reply in your last week's issue from "Outsider" to "Competitor," with your permission I will try and explain the discrepancies referred to.

Conditions.	*Accepted plan.*
Engine-room under hall.	No engine-room is mentioned in the particulars supplied to competing architects, and dated 27th April, 1878.
A hall, with justices'-room retiring therefrom.	A retiring-room, 16ft. by 16ft., is provided, but the word "justices" seems to have been forgotten.
Offices for town clerk.	Two rooms are provided, 25ft. by 14ft. and 20ft. by 13ft. (although one of these rooms can be used as a committee-room if required); opinions may differ as to the sizes being "inadequate" or not.

Has "A Competitor" ever carried out in practice competition drawings without alteration? If so, he must prepare them with more care than the majority of the profession do. He certainly has made a "mountain out of a mole-hill" in his reference to the "inspection" of the drawings while on view to any one who chose to ask to see them. Moreover, as many find out from experience, local architects are rarely without friends on the board or council (as the case may be), and under such circumstances it matters very little whether they see the drawings with their friends with closed or open doors. Possibly "A Competitor" has never lost a competition before, in which case he is more fortunate than

ANOTHER COMPETITOR.

OPEN-MOUTHED PIPES v. VENTILATORS.

SIR,—As the result of the experiments made at Kew, by the judges of the Sanitary Institute, with ventilators as against plain pipes, is still commanding considerable attention, will you permit me to publish the following results, showing the effect the shape of the outlet has upon the speed of the up-current?

I have recently put up at my house a 4in. pipe about 13ft. in height, and whose top stands about 2ft. above the ridge. At 8 p.m. last night I tried the up-current—first, with the plain pipe; then I put an expanding or trumpet-mouthed outlet perpendicularly upon the top of the pipe. This being tried, was taken off, and a patent 10in. soil-pipe ventilator, with 3in. pipe attached, put on. This being also tried, was taken off in turn, and a 3in. cowl, manufactured by another patentee, was then tried, and the following are the results—showing the number of feet per minute which each gave of up-current:—

Plain Open Pipe.	Pipe with Trumpet Mouth.	10in. Soil-Pipe Ventilator.	Patent Cowl.
200	400	300	200
200	300	200	170
200	300	200	160

In this case the plain upright pipe with expanding outlet gave much the best results, and when at 4 p.m. to-day I repeated the experiments, the trumpet outlet gave much the quickest up-current. The plain pipe again gave 200, but the patent cowl only 200, 170, and 160. The open joint where cowls turn helps to hurt their effect.

Yesterday, I tried a drain at Dr. Cassall's house, Newton-terrace, here, which has the soil-pipe going up the centre of the house to act as its ventilating shaft, and which soil-pipe carries off the rain-water from the centre gutter. The anemometer showed an in-current of fresh air into the drain through the ventilating trap of 300ft. per minute; but after running hot water down the soil-pipe, the in-current rose to 500ft. —I am, &c.,

W. P. BUCHAN,
Sanitary Engineer.

21, Renfrew-st., Glasgow, August 10th.

EXHAUST COWLS.

SIR,—The report of the Sanitary Institute on certain recent experiments at Kew, to test the exhaust power of a few ventilating cowls, is at least rather disappointing to some inventors, who have, in spite of well-known laws, maintained the suction power of their contrivances. Every one knows that a vertical pipe blown across at the top creates an extracting power, and will cause a body of smoke within the tube to be drawn out, and this pumping action is increased when the air within the pipe is warmer than that without. I do not mean to say that by a well-placed deflecting cone or other expedient at the orifice, and the addition of a cowl, the draught may not be *facilitated*, but for purposes of simple ventilation the open pipe is probably as effectual as any kind of sucking pump placed at the top, and actual observation has proved this to be the case.—I am, &c.,

G. H. G.

ON SKETCHING.

SIR,—Mr. W. R. Lethaby's suggestion in your last issue is *apropos* just now, and from my own experience I have found the "tips" to vergers and sextons somewhat of a tax upon one's purse when "doing" a tour of sketching. The passport recommended would doubtless be effectual, though there are many who have passed the stage of students, but who are still glad to inspect old buildings and sketch when they have an opportunity. I would, therefore, throw out the hint that a circular from the Institute, as a central body, addressed to the deans and chapters, clergy and custodians of interesting buildings throughout the country, would have a good effect, the object being that on presentation of a card, the bearer should be allowed to remain in the building for a reasonable time. The presence of a sexton or a verger is a great embarrassment to the sketcher, as the points of interest to that useful functionary are not likely to be so to the latter. —I am, &c.,

G. H. G.

A NECESSARY CORRECTION.

SIR,—In your issue of July 26 you say Mr. Edward Baker, master builder, of Folkestone, was drunk and imprisoned, &c., &c. It was a Mr. Butler who was so imprisoned. We are much annoyed, as we are the only builders named Baker at Folkestone or in the neighbourhood. We shall be obliged by your correcting the paragraph in a conspicuous place in your next issue.—Yours truly,

R. & D. BAKER.

14, Harbour-street, Folkestone, Aug. 9.

[The item was clipped from a local journal.—ED.]

For a new Primitive Methodist chapel and school-room at Moatside, Carlisle, the contracts have just been let, the principal being that of masons' work to Messrs. Sproat Brothers, of Talkin, and joiner's work to Mr. Winthrope, of Brompton. The foundation stone of the new buildings will be laid on the 9th prox.

Intercommunication.

QUESTIONS.

[5472.]—**Ventilation—Carbonic Acid.**—It has been one of the *vexatæ questiones* among sanitary men, and has given rise to considerable difference of opinion regarding the value of upward or downward ventilation, whether carbonic acid, one of the chief products of respiration, remains at the bottom of a room by virtue of its weight, or is found equally mixed throughout the air of a vitiated apartment. Professor Pettenkofer has found, by experiments in the wards of a lying-in hospital at Munich, that the carbonic acid is pretty evenly distributed, though the results rather indicate that the quantity was smaller at or near the floor than at the ceiling. The same fact, however, was established, I remember, by a commission on the ventilation of barracks and other rooms, and the Blue-book published by order of Government in 1857, and along with the well-known law of gases to increase in bulk and become lighter when heated, and the equally well-known principle of diffusion of gases and their transpiration, it is extraordinary how any theory of a downward ventilation could have been founded on the idea of an invariably heavier and descending gas. I should be glad to know if the above experiments have been contradicted by any recent authority, and on what grounds?—G. H. G.

[5473.]—**Tile Roofs.**—I am a young architect in the Midlands, and am about to construct a tile roof, but am alarmed to see that nearly all tile roofs in this neighbourhood are covered with a dirty green. Can any of my friends inform me how to obviate this, or can they inform me of a tile which will not vegetate?—O. P. J.

[5474.]—**Tiles.**—Some buff or red tiles, 4in. or 6in. square, with a pattern stamped on, are required to fill in spandrels over window heads. The buff colour would be preferred with a sanded surface. The tiles must not exceed 1½in. in thickness. Can any reader tell me of such?—Yeo.

[5475.]—**Salisbury.**—I purpose spending a fortnight in Salisbury and vicinity. Would any correspondent kindly give me a list of churches and a few domestic buildings which might be visited in that time? I wish to see Early English work, and good specimens of ancient woodwork.—Scot.

[5476.]—**Roof for Hoffmann's Kiln.**—Will any reader who understands the above kindly tell me the simplest and cheapest form of roof? The extreme diameter of kiln is 90ft., and it is desired to roof the whole area from chimney to outer wall.—J. N. H.

[5477.]—**Timber.**—I should feel obliged if some practical friend would kindly answer me the following queries regarding building timber:—Is "pine" and "fir" timber one and the same kind of wood when applied to European productions? When timber is specified "Baltic fir," is red or white wood meant? Also, what kind is meant when specified Baltic "pine?" Then, again, should the term be Baltic "red," or Baltic "yellow," when the opposite wood to "white" is intended? Are there balks of Memel, Dantzic, and Riga white timber, as well as the other kind? If so, are these white balks or scantlings cut therefrom, as good and durable and as fit for the carpenter as the other kinds of white wood? Are there Baltic "red" deals and "yellow" deals, or are "red" and "yellow" two terms for the same kind of wood? Is European "spruce" one and the same wood as "white" wood? Are these Baltic whites (or spruce) in every case the counterpart of similar reds (or yellow) spruce? Are "Swedish" red (or yellow) and "white" deals as durable or as good as other similar woods? What wood is meant by the term "red pine?" Is American spruce as good and durable as European spruce? The foregoing queries are somewhat formidable; I trust, however, some one will be kind enough to solve them for me, for really in this matter it is difficult to obtain plain, clear, and exact information. I think there is considerable confusion in the matter, and the subject is one of general interest.—Wood.

[5478.] — **Ready-Reckoner.** — Will some one kindly recommend to me (from actual experience) a book of the ready-reckoner class, adapted to the needs of the quantity surveyor—viz., giving the squaring up of items taken in feet and inches?—Figures.

[5479.]—**Parquetry, &c.**—I shall be glad to learn the titles of any good books on parquetry and marquetry.—Essayer.

[5480.]—**Sketching Tour.**—I propose spending my week's holiday in making a short sketching tour, starting from London. I should feel exceedingly thankful if some one (and I feel sure many of your readers must have been for such a purpose) would give me any hints on the subject. What would be the best route to take, and what would be the most interesting places to visit?—Student.

[5481.]—**School Windows.**—I should feel obliged by information as to the best kind of windows for Board Schools. The objection, I believe, to sash windows is that they cause draught when opened for ventilation. Would this be satisfactorily obtained by a portion hung at bottom and opening inwards by means of cords and pulleys, a hopper-shaped louvre being fixed internally over same to give the air an upward current?—Anxious.

REPLIES.

[5286.]—**Village Clubs.**—I find a paucity of information on this subject in the back volumes of the Building News. Plans were given, in March 2nd, 1877, of a "British Workman," at Upper Norwood, and the accommodation provided is as follows:—Ground floor: Bar, dining-room, kitchen, meeting-room (20 × 34ft.), and various offices. First floor: Reading, smoking, and game rooms. 2nd floor: Caretaker's residence. "The Cocoa Tree," Pinner, designed by Messrs. George and Peto, was illustrated 8th March last. The accommodation there given is:—Ground floor: Coffee-room, with bar, kitchen, living-room, &c. Floor above: Club-room (about 19 × 22ft.) and bedrooms. I should imagine the amount of accommodation must always be regulated by the circumstances of each individual case.—C. P. Edwards.

[5326.]—**Ice Houses.**—A drawing of a simple ice-house was given in the Building News, 9th August, 1872. The instructions were, to dig a trench in a bank facing the north, 4ft. wide and 4ft. deep at upper side, and 18in. at the lower. Six inches above the bottom place a wattled hurdle, on which the ice is to be placed. The roof to be of thatch, 12in. to 18in. thick, and overlapping the trench 1ft. each way. A hinged trap 18in. square is to be formed in the roof for access to the ice. A pit described by another correspondent was a simple hole in the ground 15ft. square at top and tapering towards the bottom. The covering was a shed roof of straw 1ft. thick, supported by a post at each corner, 2ft. from the ground. This space of 2ft. was always kept open, and being 4ft. and 5ft. outside of the ice, it excluded all influence of the rays of the sun. On filling the house straw was laid on the sides, then broken small and rounded up as much as possible, and then covered with rye straw to the thickness of 2ft. The house was never known to be empty. Another, constructed on *scientific* principles, never kept ice after the month of July. To keep ice well you must have perfect drainage, a thick covering of non-conductor, as rye straw, perfect circulation of air, and perfect shade. As to the shape or mode of structure the owner can please his own fancy.—C. P. Edwards.

[5345.] — **Opus Alexandrinum.** — Seeing no answer to this query, I sought for one myself. But indices to vols. of Building News and encyclopædias proved useless, and I had almost given up the search in despair, when I bethought me of the South Kensington Museum "Art Handbooks." And this is what I found:—"A third variety of Christian and mediæval mosaic, commonly used for the paving of Italian churches from the fourth or fifth century down to the thirteenth, is called Opus Alexandrinum. It may be described generally as tesselated marble work—an arrangement of small cubes, usually of porphyry or serpentine, composing geometrical patterns in grooves, cut in the white marble slabs which form the pavement. We have reason to believe that this variety did not remain in general use nearly so late as either of the two previously described (see handbook), and that it was discontinued about the end of the thirteenth century."—C. P. Edwards.

[5436.]—**R. C. Church at Arundel.**—The Roman Catholic Church of Our Lady and St. Philip Neri, at Arundel, was designed by Messrs. J. A. Hansom and Sons, of London. The church was fully illustrated and described in the Building News of February 13th, 1874.—E. E. B.

[5437.]—**Worm in Red Deal.**—Two or three applications of spirits of turpentine to the parts affected by worm will effectually stop their further ravages, but will not prevent the part already attacked from being noticeable, it being the sap-wood on the edges that is now decayed.—M. Hawney.

[5458.]—**Waterproof Covering.**—A coating of asphalte properly laid on, say 2in. thick, ought to make a perfectly staunch covering.—M. Hawney.

[5465.]—**Construction of Roof.**—An ordinary collar tie principal, with collars projecting sufficiently to give a seat for purlins, will be the most economical, and get sufficiently strong for that space. If the truss should not show its depth into room purlins can be framed in between and back of trusses, kept fair with common rafters.—M. Hawney.

[5467.]—**Slating Battens.**—In answer to first query: Yes, as I am of opinion that the puckering of the boarding often cracks the slates. To second query: It would be better to block the battens up certainly, to prevent speedy decay of wood boarding. Query 3: For one reason I should be inclined to place the felt over the battens, as it would assist ventilation. For convenience of the slater no doubt the felt nailed to the boarding with the battens upon it is better. 4: Split laths last longer.—G. H.

[5469.]—**Mr. Parker's System of Ventilating Sewers.**—I may inform Mr. W. P. Buchan that, according to Mr. Parker's report, Sir J. Bazalgette has generally approved of the system he refers to. I am as astonished as W. P. Buchan is, that a half plan, as this really appears to be, should have been recommended. No amount of air "forced in" can render some drains innocuous, and the defect of the principle is that the fresh air is introduced at one point, but that no special provision exists as regards the traps which may be within the house.—An Old Correspondent.

Our Office Table.

Herr W. Reissig has invented a coating for walls for which he is about to obtain a patent. It consists of a spirituous solution of stearate of soda, prepared in the proportion of 50 grammes of stearate dissolved in 1,000 grammes of spirits of wine, of a strength of 66 per cent. Other solutions of soap in spirit of wine of more or less strength may be used; but stearate of soda forms the hardest and most impermeable coating, though more expensive. For stables, spirituous solutions of common brown soap or soft soap suffice, but the stronger the spirits the better. The solution may be coloured with aniline colours, yellow ochre, or dragon's blood. The coating is said to take well on wood, lime, and cement. Size colours are suitably fixed beforehand, a solution of chromate of alum being recommended.

A consignment of woods, recently arrived in this country from Calcutta, has been looked upon quite as a novelty, inasmuch as they are the produce of our Indian forests, and are, so far as the *Gardener's Chronicle* is aware, the first batch that has ever been sent to this country for sale by the Forest Conservancy Department. The woods have come over in irregularly shaped logs, some of very large size, and are very varied, so far as quality is concerned, for structural or manufacturing purposes. Thus, for instance, appeared among them such woods as Box (Buxus sempervirens), Olive (Olea cuspidata), the soft and apparently useless wood of Alstonia scholaris, as well as the woods of many other trees well known for the fruit, resins, or other economic products produced by them, but hitherto unknown in this country, at least as timber trees. The collection was sold a short time since by public auction, and realised fairly good prices. It remains, however, to be seen whether the prices obtained were sufficiently remunerative to induce the authorities to send another consignment.

The following is the result of the 17th annual competition for prizes offered by the the Plasterers' Company in connection with the Department of Science and Art, South Kensington. For an original design in monochrome for a ceiling of a room, with centre of chandelier: First prize, C. E. Wilson, of the Sheffield School of Art; second prize, L. M. Benson, of the National Art Training School, South Kensington. For an original design, modelled in plaster, for a portion of a ceiling centre:—First prize, H. Harvey, of the National Art Training School, South Kensington; second prize, W. Wallen, of the Westminster Royal Architectural Museum School of Art. The competition drawings and models are now on view at the annual exhibition of national art students' work, South Kensington, and are referred to in our article thereon elsewhere.

Professor Paley asserts that the blackness of London buildings does not proceed altogether from smoke and dirt. He declares that some stones—such as that of which St. Paul's Cathedral is built—will, if not properly pickled, develop, in the course of time and in the shade, a small black lichen. Sunlight is destructive of this stealthy destroyer. Professor Paley supports his theory by the fact that on the north side of St. Paul's, as well as in the parts of Peterborough Cathedral and the Circus at Bath, which are built respectively of Portland, Barnack, and Bath stone (all belong to the lower oolites), this blackness appears, whilst the sunlit parts of the same buildings are almost, if not quite, white. Further investigation into the nature of this new lichen, or whatever growth it may be, would be very desirable.

The General Purposes Committee have reported to the Court of Common Council upon the scheme of the Committee of Livery Companies for the best mode of applying the funds which the Corporation and the committees might be disposed to contribute towards the extension and improvement of technical education. The means by which this is to be accomplished are the establishment of local trade schools and a central institution, with a suitable staff of professors. To the former are to be admitted persons who, having received ele-

mentary instruction in the principles of science and art, desire to be taught their application to particular trades by teachers having a competent knowledge of the actual practice of those trades, as well as of the scientific and artistic principles to be applied to them. The latter institution is designed to give more advanced instruction, no person being received who is not shown upon examination to have acquired a sufficient knowledge of science and art to enable him to profit by the instruction there to be given, which it is proposed should embrace applied physics, chemistry, mechanics, and art, to be taught by competent professors, aided by suitable assistants and a sufficient staff. The central institution thus constituted would undertake the instruction of regular students, the delivery of evening lectures relating to applied science and art, the holding of evening classes in connection therewith, the discussion of important discoveries in trades, and, generally, the promotion of the application of science and art to industry. The scheme further contemplates the provision of exhibitions for meritorious students, tenable at the central institution, assisting technical classes already established, aiding efforts made at the seat of special manufactures in furtherance of technical education, and providing prizes, premiums, and apprentice fees. The board of governors, estimated at 300 members, is to consist of liverymen of London, and to include representatives of the Corporation and every contributing company. The council is to be composed of 80 and the executive committee of 40 members.

Arrangements of importance as affecting the gas-consumers of the metropolis are now in course of preparation by the London gas companies. Ten years ago there were as many as thirteen gas companies in the metropolis. Of this number six have amalgamated with the Chartered, and one with the Commercial. Of the six existing companies, the Phœnix—which takes rank in magnitude next to the Chartered—has just agreed, conditionally by its directors, to terms of amalgamation with the latter company. The Phœnix supplies half the gas consumed in South London, while the Chartered furnishes two-thirds of the total supply of the whole of the metropolis, the entire City being part of its district. It is further understood that terms are on the eve of settlement for the amalgamation of the Surrey Consumers' Company with the Chartered. A proposition for amalgamation with the Chartered has likewise been laid before the South Metropolitan, and although there are apparently some difficulties in the way, it is not unlikely that this company will follow the same course that has been taken by so many others. The Commercial and the London remain to complete the system. As the former has itself absorbed the Ratcliff, it has so far given a practical proof that it considers amalgamation desirable. These plans of amalgamation are subject to the approval of the shareholders and the sanction of the Board of Trade, but no application to Parliament is necessary. A large extension of the Chartered system is evidently imminent, and decided progress will thus be made towards the amalgamation of all the London gas companies into one body, in agreement with the recommendation of the select committee presided over by Mr. Cardwell in 1867, and also in conformity with the Acts passed by the Legislature.

The selection of subjects for the mural decoration in the Manchester Town Hall has been made, and Mr. Ford Madox Brown is already at work upon his portion of the work. The list is as follows:—No. 1. The Romans in Britain: Agricola builds a fort at Mancunium, A.D. 79. No. 2. The Saxons: Baptism of Eadwine at Manchester, A.D. 627. No. 3. The Danes: After a hard fight they seize the town, A.D. 870. No. 4. Origin of Manufactures: Establishment of Flemish weavers in Manchester, A.D. 1330. No. 5. Early Reformation Movement: John of Gaunt, Duke of Lancaster, defends Wickliffe before the Consistory Court, A.D. 1377. No. 6. Commercial Integrity: Weights and measures tested by municipal decree, A.D. 1566. No. 7. Science: William Crabtree on Kersull Moor (now part of Manchester) discovers the sun's parallax by observation of the transit of Venus over it, A.D. 1566. No. 8. First Blood drawn in the Civil War: Captain Bradshaw, with thirty musketeers, beats back Lord Strange's army, 4,500 strong, A.D. 1642. No. 9. Education: Humphrey Cheetham, merchant, establishes his free school for boys, A.D. 1650. No. 10. Jacobite Movement: Prince Charles Edward musters his troops in the Collegiate Churchyard, A.D. 1745. No. 11. Cotton: John Kay, inventor of the "fly shuttle," is saved from the fury of the mob in a wool sheet, A.D. 1753. No. 12 (objected to). "Peterloo Meeting," as heralding Reform.

At the Crystal Palace, on Saturday last, General Henry Hyde, R.E., distributed the certificates awarded by the examiners for the summer term in the Crystal Palace Company's School of Practical Engineering. Sixty certificates were taken. The first in each class was as follows:—Lecture Work, P. J. Ogle; Drawing Office, A. T. Anderson; Pattern Shop and Foundry, A. C. Pickthall; Fitting Shop, M. F. Wilson; General Surveying, F. J. Scott; Railway and Dock Work, W. A. Fenton; Design and Construction, G. S. Aitken. The examiners were—Mr. Ernest Benedict, M. Inst. C.E., and Mr. J. W. Grover, M. Inst. C.E. Their report, which was generally laudatory of the work done, concluded by recording the examiners' opinion of the great value of the school, which, in their belief, would satisfy a long-felt want in this country. They especially commended the idea of the Colonial Department, which, in connection with the Practical Engineering School, would, they believe, lead to most valuable results in regard to the numerous young men who now seek a livelihood by adventurous labour or professional work abroad and in the colonies. The works produced by the students were displayed in the several shops and offices in the south tower.

The proposed employment by the Newcastle-on-Tyne Town Council of officers in the borough engineer's department for designing and carrying out of public architectural works was taken into consideration on Tuesday, at a special meeting of the Northern Architectural Association. A resolution was unanimously passed, in which it was decided to memorialise the Town Council on the subject, expressing the great dissatisfaction and regret with which the association view the proposal, not only on account of the disadvantage of the present practising architects, but also because of the detriment to art and architecture for years to come; and, further, suggesting to the Town Council the desirability of following the customary practice of putting all public architectural works to competition.

We have before us Part IV. of the "Architectural Association Sketch-book for 1878," and the selection of sketches offers considerable variety. Thus, one plate contains some capital specimens of wrought-iron work, partly measured, consisting of gates and balustrading at Stockwell, Kensington, Chelsea, Clapham, and the Temple. Some very interesting sketches of Italian doorways occupy another plate. These are from the late Sir Digby Wyatt's sketches, and are all good Italian examples. A sketch, contributed by Mr. T. Batterbury, of Villers St. Paul, showing the fine early saddle-back tower, is interesting; so is Guesting Church, near Hastings, a picturesque little building of brickwork and plaster, with some interesting Norman detail. Two Northamptonshire church towers—St. Peter's, Weston Favell, and St. Peter and Paul, Mardford—and the three tombs in the north chantry of St. Thomas the Apostle, Winchelsea, Sussex, make up the other illustrations. Commending, as we do, the excellent and suggestive materials the "Association Sketch-book" invariably contains, a little more care in some of the sketches, and attention to the uniformity of the size of sketches and style of printing may be desirable.

We have received an ingenious combination of set-square, scale, and protractor, patented by Mr. W. Carr Crofts, of Cookridge-street, Leeds. This instrument is simply an ordinary set-square of vulcanite, known to all architectural draughtsmen as an angle of 45°, with the inner edges feathered and divided into scales of feet and inches for horizontal and vertical dimensions. Any scales may be engraved, but the one before us has on each of the right-angled edges a ¼in. and a ⅛in. scale, as those most in use in architects' offices. The hypothenusal leg is similarly divided into degrees, the divisions being radiated from the inner angle of set-square. The reverse side of set-square can be used to set-off joists and rafters to ¼in. and ⅛in. scales; the adjacent scale is divided into a scale for risers from 5in. to 8in. rise, while the longest side is divided into treads from 9½in. to 11½in. Every architect will readily understand the value of these scales, the chief advantages being economy of time and labour in drawing plans, elevations, and sections, the dispensing with the ordinary long scale, the saving of time in ticking off dimensions and of moving the set-square, which operations are now resolved into one movement. Other self-evident advantages will suggest themselves to every architect and draughtsman. We have often desired the edges of our set-squares to be so divided, especially in plan-drawing, while the facility with which any angle may be set off will do away with the protractor. Every architect and engineer will hail the introduction of Mr. Crofts' improvement, so simple and obvious, and yet till now strangely enough overlooked by the instrument-maker. The instrument is sold by W. H. Harling, of 40, Hatton-garden, E.C.

Two processes for the preservation of iron by coating it with a film of magnetic oxide, says the *English Mechanic*, are now fairly competing for public favour. That of Prof. Barff is well known, and Mr. Bowers's will soon be appreciated when the results of certain experiments recently made at Dudley become known. There, at the works of Messrs. Cochrane, his apparatus has been erected, and he has demonstrated the possibility of coating various articles with the preservative oxide. An iron chamber is set in a furnace in such a manner that it can be heated to a dull red, very much in the same manner as a retort for making coal-gas is arranged. A tight fitting lid, perforated with two holes—one for the admission of a pipe by which air is conveyed to the back end of the chamber, and one for its exit when deoxidised, closes the front end; and is opened only when it is required to withdraw the articles to be coated. Any description of the plant is, however, premature, because, although designs exist, the present chamber is merely a temporary arrangement employed to demonstrate the practical value of the invention, which so far as cast iron is concerned has now been done. To produce the magnetic oxide on wrought iron and steel will necessitate some modification, but as the invention is now known castings can be effectually protected from rust at a cost of about £1 per ton, with this advantage, that the coat put on them is so pleasing that in many cases paint will be dispensed with.

Erratum.—Summer Residence at Formby.—Most readers will already have seen that the names of the architects in the first line of the description of the above illustration, which appeared last week on p. 130, should have been "Bell and Roper," and not "Bell and Rogers."

Erratum.—Hydrogeological Surveys.—In our article on "Hydrogeological Surveys," in the last number but one, by a printer's error, the words "and the artesian system" were omitted in the sentence, which, thus amended, reads:—"In this survey we have the areas of outcrop plainly shown, and the artesian system by contour lines in red and yellow."

At the half-yearly meeting of the Cambridge Waterworks Company last week it was reported that extensive new works, including duplicate main to the town, had been satisfactorily completed at the pumping station, Cherryhinton, by Messrs. Bell and Sons, the building contractors, and Mr. J. I. Headley, contractor for new engine and boiler.

The Camberwell vestry have accepted the tender of Messrs. A. C. W. Hobman and Co., for tar paving throughout the parish.

A new school, in Camperdown-street, for the Oakbank district, was opened by the Glasgow School Board on Friday. The style is Domestic English, and the building is erected from the designs of Mr. Robert Baldie. The accommodation is for 960 children. The cost of the building is £11,741 15s. 4d., or an average per head of £12 12s. 6d., and, adding the cost of the site, £4,771 10s. 1d. (for an area of 2,960 square yards), a total expenditure is arrived at of £16,513 5s. 5d., equal to £17 15s. 1d. per scholar.

PARLIAMENTARY NOTES.

The New Opera House.—Mr. Whitwell asked the chairman of the Metropolitan Board of Works last week whether the hoarding connected with the apparently discontinued New Opera House on the Embankment would soon be removed, as it had for a long time been an obstruction to the footpath. Sir J. M'Garel-Hogg replied that the time fixed for the final completion of the New Opera House was the 29th of September. It was, of course, hopeless to expect that the building would be finished by that time, but until the date named the board had no power to take any steps in the matter. He would, however, call the attention of the board to the subject.

The Metropolitan Water Companies.—Mr. Fawcett on Wednesday asked if the Government proposed to introduce a bill to deal with the enormously increased charges of the metropolitan water companies. The Chancellor of the Exchequer: This matter connects itself with a very large question, and I am not able to give any positive information on the subject. No doubt it is a matter which requires the serious consideration of the Government. Mr. Fawcett: In the event of the Government not taking any action in the matter next session, I shall ask the House to express its opinion upon the subject.

LEGAL INTELLIGENCE.

Light in the City.—Saxby *v.* Stokes.—This was a motion before Vice-Chancellor Sir Richard Malins, in the High Court of Justice on August 8, on behalf of the plaintiff, who was the owner and occupier of 77, King William-street, known as Littlejohn's Restaurant, for an injunction to restrain the defendant, who was the owner of premises, 11, and 12, St. Clement's-lane, at the back of Littlejohn's Restaurant, from building up a wall to such a height as to darken the skylight over the dining-room attached to the restaurant. There were affidavits on both sides as to the amount of light which was taken away from the plaintiff's window, and the defendant relied upon certain negotiations which had been entered into between him and the plaintiff. Mr. Myers Taylor having given evidence as to facts of the case, and explained model of the premises, Mr. Marsh Nelson was next examined. The Vice-Chancellor said he was satisfied from the evidence that the wall to be erected by the defendant must to some extent be injurious to the plaintiff's skylight, but whether to such an extent as to entitle him to an injunction at the hearing, he would give no opinion at present. In the circumstances he considered that the justice of the case would be met by ordering the motion to stand to the hearing. If the defendant determined upon going on with his building in the meantime, it would be at his own risk, and if the Court should be of opinion that the plaintiff was right, the defendant must distinctly understand that he would be ordered by the Court to pull down the building.

CHIPS.

At a recent meeting of the Norwich School Board it was resolved that the preparation of plans for a proposed new school be thrown open to competition. It was stated by the mayor that when Mr. Brown, the architect, was appointed it was as "adviser," not as "designer," to the board.

A petition for liquidation was filed in the Manchester Bankruptcy Court, on Friday, by Wallace Moore and William Scott, trading in Greenheys and Chorlton-on-Medlock as builders under the style of Moore and Scott. The liabilities are estimated at £20,000.

The local board of Newmarket considered and approved, at their meeting on Wednesday week, plans prepared by Messrs. Clark and Holland for the drainage of the district.

The old manor-house at Dulwich, occupied in the early years of the seventeenth century by Edward Alleyn, the actor, and founder of the college, is doomed; the site of house and grounds are being plotted out for suburban villas.

Foundation stones of a new Wesleyan chapel were laid at Wavendon, near Woburn, on Wednesday week. The contract has been taken by Mr. Bransom, builder, of Newport Pagnell, at £531.

The 16th annual meeting of the Carlisle Diocesan Church Extension Society was held on Tuesday week at Keswick. The report showed that the income had been £2,357 18s. 5d., against £945 16s. 6d. the previous year, besides legacies to the amount of £6,050. Amongst the grants were six to church buildings, amounting to £650, and three for parsonage buildings amounting to £500. From the operations of the society 68 churches have been built or restored, and 62 parsonages built, during the past 16 years.

The Killamarsh School Board determined at their last meeting to build new schools in Belk-lane, and instructed Messrs. Innocent and Brown, of Sheffield, to prepare plans for the same.

The completion of the water supply scheme for the village of Kilmalcolm, N.B., was celebrated yesterday (Thursday). The water is brought from Blackwater, a distance of three miles, and the total cost has been £3,000.

The Theatre Royal, Wolverhampton, was reopened on Monday week after internal renovation and re-decoration, carried out under the superintendence of Mr. W. H. Ward, of Birmingham. The structural alterations have been made by Messrs. Dawson and Bradney, of Wolverhampton; the mechanical arrangements by Mr. H. Cross, of the same town; and the upholstering by Mr. W. Wood, also of Wolverhampton. The transformation is complete—where dirt, dinginess, and disorder reigned are now to be found brightness, elegance, and comfort.

The new wing on the south side of the Clerkenwell Sessions-house is nearly completed. The new building, are 25ft. in length, with a frontage to Clerkenwell-road of 70ft., and a height exceeding 50ft. They are faced with Portland, and of a uniform character with the free Italian of the old building. Mr. F. H. Pownall is the architect, and Messrs. Higgs and Hill are the contractors; the cost has been £12,000. Messrs. Patman and Fotheringham have in hand the contract for the re-decoration of the old building.

A branch Congregational school was opened at Audley, near Preston, Lancashire, a fortnight since. The buildings cost £3,500, and accommodate 450 scholars, but class-room extensions are contemplated, which will cost £1,500 more. Mr. W. Vawley was the architect, and Messrs. T. Higson and Sons the contractors.

The freedom of the borough of Dundee was publicly presented to Mr. Bouch, C.E., the engineer of the Tay Bridge, on Friday.

A memorial bust of Izaak Walton, the "father of anglers," was unveiled in St. Mary's church, in Walton's native town of Stafford, on Thursday. The bust has been executed by Mr. R. Belt, a pupil of Foley's, and is taken from the portrait by Houseman, in the National Gallery.

The Todmorden Local Board have decided to erect a market-house on land in their possession. It is to be constructed principally of glass and iron, at an estimated cost of £3,500.

In answer to their advertisement, the Southport borough council had 67 applications for the situations of assistants in the surveyor's office. They have appointed Messrs. Wm. Gordon, of St. Helen's, and John Boothby, of Oldham.

Several specimens of Roman pottery have been discovered during works of rebuilding at the rear of 9, Walbrook, E.C.

A new Roman Catholic Church of St. Patrick, erected at a cost of £2,500, has been opened at Ballybay, co. Monaghan. Gothic in style it has a massive tower, crowned by a spire, and the altar is richly ornamented.

The Essex Church Building Society last week voted a grant towards the enlargement of Ramsden Bellhouse Church.

Dormitories, day-room, large dining-hall, covered bowling-saloon, &c., are to be added to the Convalescent Home, Southport. The contract was let on Tuesday. The architects are Messrs. Smith and Heathcote, Manchester.

A new school at Hillhouse was opened by the Huddersfield School Board on Monday week. It accommodates 630 scholars, at an outlay of £6,380.

The Halifax Town Council have accepted the tender of Messrs. Kendall for the construction of sewers in Southowram-bank.

The new graving dock at Newport, Monmouthshire, was opened last week. It opens out from the Alexandra Dock, and is 500ft. long and 74ft wide at water line, and 56ft. at the bottom, 25ft. in depth. There are three piers with flights of stairs. The walls are of concrete. Mr. James Abernethy, C.E., has been consulting engineer; Mr. Walsh, C.E., resident engineer; Mr. Holmes, superintendent of works. The contractor was Mr. John Griffiths.

The parish churchyard at Doncaster has been enclosed, new railings set up, and the gravestones relaid. The work has been carried out by Mr. Farr and Mr. Athron, at a cost of about £400.

Mr. John Henry Davidson, surveyor and architect, of Puckeridge, Herts, was accidentally drowned on Saturday week whilst bathing in the Thames at Stanford-le-Hope, Essex. Mr. Davidson was 47 years of age.

The first sod of the branch line, from Thorpe-le-Soken to the new watering place of Clacton-on-Sea, was publicly cut on Thursday se'nnight. The line is 4¼ miles long, and is expected to cost £30,000. Mr. Peter Bruff, of Ipswich, is the engineer, and Mr. Ogilvie the contractor.

The memorial stone of St. John's Wesleyan chapel, Parkview-road, Manningham, was laid on the 3rd inst. It is Early English and Decorated, Gothic in style, and will have a spire 154ft. high. It will seat a thousand persons, at a cost, for site and building, of £10,000.

Plans, prepared by Messrs. Thomas and Taylor, civil engineers, of London, have been approved by the Southend-on-Sea Local Board for the sewerage of Prittlewell.

The trustees of South-parade Chapel, Halifax, accepted tenders, amounting in all to £9,700, for the erection of a new chapel in Prescott-street, in accordance with the plans and designs prepared by Mr. W. S. Barber, of the same town. The style of the new building is Perpendicular Gothic. The chief contracts are:—Excavator and mason, Mr. Jenkinson; carpenter and joiner, Mr. Bedforth; plumber and glazier, Mr. J. Naylor; slater and plasterer, Mr. Firth; painter and stainer, Messrs. Wm. Lee and Son.

Plans for proposed schools in the Marshes district have been prepared for the Newport, Mon., School Board by Messrs. Habershon, Pite, and Fawckner.

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THE BUILDING NEWS.

LONDON, FRIDAY, AUGUST 23, 1878.

ENGLISH PICTURES AT THE PARIS EXHIBITION.

THERE hangs over the entrance to our picture gallery at the Paris Exhibition a modest little tablet, inscribed "Ecole Anglaise." There is more than would at first sight appear in these two simple words; and, rightly or wrongly, they sum up the art-labours of a century. Have we an English school or not? Enter the galleries and see the results of a decade of our work—a choice collection of the most notable pictures of which England can boast. We can well remember the half-impertinent curiosity with which French artists criticised the first few pictures which were placed upon the walls of the ill-lighted galleries in 1855. We recall most vividly the surprise which our pictures produced upon them as one after another the hangers added the Landseers, the Mulreadys, and the Leslies to the group, until, finally, the French jury were compelled to admit that we, too, could paint.

The English pictures at Paris will produce a thrill of pleasure in the breast of every genuine lover of art. The great room is all ablaze with Millais' works; Landseer's animals are unrivalled; the tender beauty of George Leslie's school-girls, the sweet, fair maidens of Calderon, the grim outcasts of Fildes, the landscapes of Vicat Cole, and the portraits of Watts are all proofs that we have a distinctive school, unfettered by the academic traditions of Italy, of Holland, or of Germany: we possess, in fact, a group of painters who have achieved eminence in genre and in landscape by methods essentially characteristic, and our artists have impressed upon their work sufficiently abundant indications of a distinctive nationality to constitute a school—a school, moreover, which, to judge from the works to be found here of other countries, is imbued with a life and vigour second to none among the chief European centres of art-work.

The English picture galleries have an air of finish and completeness about them which is in itself characteristic. The doorways are draped with tapestry, the floor is covered with neat matting, and the colour of the walls, a full rich brown, is to be found in no other galleries. The pictures have been, as far as possible, hung together in groups, keeping the works of each artist together, and for no one has this mode of arrangement been better adapted than for Millais, whose art has never appeared to greater advantage. Right and left of the "Beefeater," the brilliancy of whose uniform must have tempted the artist to tackle such a feat of chromo-gymnastics as this work involves, are the two best of Millais' landscapes—"Chill October" and "O'er the hills and far away." The russet tints of the foliage, the sere reeds, through which we can almost hear the wind rustle, in the first of these pictures, are perhaps aided by the glowing colour of the "Yeoman of the Guard" more than the delicate shades of the distance in the latter picture, which is by far the pleasanter subject of the two. "The Sisters," a charming portrait of the artist's little daughters, we prefer to the more ambitious group of the three Misses Armstrong, exhibited under the title of "Hearts are Trumps." The picture might equally well have been called "Whist with a Dummy," as the three young ladies are seen at a card-table. Millais has done nothing better than "The North-West Passage." The face of the old seaman is admirably painted, and but for the girl's pink dress we could find no fault with the picture. The fine likeness of the Duke of Westminster places Millais in a high rank as a portrait-painter, and only in a lesser degree excellent is the portrait of Mrs. Bischoffsheim. There are still two other pictures hung apart which make up the complement of ten sent by this artist. "The Gambler's Wife," who is evidently trying over some cards thrown aside the night before, and "Yes or No," the well-known picture of a girl who has received an offer by post, enclosing a carte-de-visite, which she holds behind her in an agony of doubt over the "fatal question." The side walls of the principal gallery are devoted, the one to Frith and the other to Landseer. Frith is strongly represented by "The Derby Day," "The Railway Station," "The Salon d'Or at Hombourg," and "Charles II.'s Last Sunday at Whitehall." We are not great admirers of Mr. Frith's art, though it would be absurd to deny that he has much power in depicting scenes of everyday life. He fails in giving beauty and refinement to his models, even where these qualities are most needed by his subject. In his scene in Charles II.'s court, however, he has succeeded perhaps better than in any of his other works here in bestowing grace and dignity upon his characters. The works by Sir Edwin Landseer are six in number, and of these "The Sick Monkey," which is inimitable, is by far the best. "The Swannery Invaded by Eagles" is a large and important subject, and the white bears destroying the relics of some Polar expedition, entitled "Man Proposes and God Disposes," is a painful idea forcibly carried out; the colour of the ice floes has been much criticised by Arctic travellers. The Prince of Wales lends two works by Landseer—"The Indian Tent" and "The Connoisseurs"—the latter picture is the portrait of the artist, with two splendid deerhounds apparently peeping over his shoulder at his work. "The Ptarmigan Hill," lent by Mr. John Fowler, completes the list of Landseer's works here.

The end centre of this room is ably filled by Mr. G. F. Watts, who is represented by nine of his best works. His "Love and Death" is, in spite of its mannerism and its affected imitation of the Venetian school, a fine work, and his admirable portraits of Joachim, Browning, Calderon, Mrs. Percy Wyndham, and the Duke of Cleveland prove him a worthy champion of a school of painting which has at present few exponents in England. Among the notable works which are clustered at this end of the gallery an important place must be given to "The Beguiling of Merlin," by Mr. Burne Jones. Though the work of this artist in many respects falls short of the standard we have set before us as truly typifying high art, we acknowledge that he is an undoubted poet, as shown by this and many other of his pictures. There is a dreamy poetry about this picture which impresses even the most casual observer. The May blossoms, though realistically treated, are a study in themselves, and the figure of the enchanter is finely conceived. We have had unusual facilities since the opening of the Grosvenor Gallery for the study of the "romantic" school, which has never been represented in any force at the Royal Academy, and the group of works at Paris, in spite of the absence of some of the leaders, enables us to form a fair opinion of its merits and its defects.

At the same end of the gallery is the famous picture by Mr. Poynter, "Israel in Egypt," which is marvellous in its brilliancy and in the abundance and minuteness of its detail. We are quite carried back to the old days of Egypt's greatness and power when we examine this procession of the Sphinx. Another picture which hangs beside it, "The Catapult," proves the antiquarian knowledge of this artist, and his skill in the delineation of the nude figure. Before passing from the principal room we must glance at the works of Mason and of Walker, two painters, each of whom in his way achieved originality, and whose art marks an epoch in the English school; both of whom also died too soon, the latter almost at the outset of his career. Mason is represented by some of the earliest and latest of his works—of the former period while he was strongly influenced by Italian art the "Nelle Maremme" is a fine illustration, while the "Evensong" and the "Return from Ploughing" show us his later manner. Walker's fame as an oil painter is sustained by a single work, "The Old Gate," which is perhaps one of his best pictures, though not so pleasant in colour as some of his later works.

The small galleries are by no means behind the principal one in the excellence and the high quality of their contents: nearly the entire end wall of one of them is devoted to Alma Tadema, who contributes ten works. The large subjects "The Picture Gallery" and "The Sculpture Gallery," lent by Mr. Gambart, form noble pendants, and place this recent acquisition to the ranks of English artists in the foremost position as a painter. It is difficult to select one more than another of his pictures for commendation. Most of them have been seen before, and are familiar to us by the engravings. Perhaps "The Vintage Festival" is the best work here, though "A Roman Emperor" is wonderful in the texture-painting, the representation of marble, and the antiquarian lore, which are the chief characteristics of Mr. Tadema's work. A charming little picture entitled "A Roman Garden," marvellous in the richness of its colouring, is new to us, as is also one of his early works, which we like least—"The Death of the First-born." Mr. Val Prinsep comes out well in this gallery. His "Linen-gatherers" shows some pretty rosy-cheeked girls coming down a hill-side, the whole being well and solidly painted. The smaller picture, "Reading Sir Charles Grandison," is also admirable in its way. The Scotch school is likewise in force here. Pettie has seven works. Of these the best are "Treason," "Terms to the Besieged," and "The Flag of Truce." His portraits, notably that of Bishop Ullathorne, are very successful. Orchardson's "Portrait" is also one of his best works, and the same dark lady, Mrs. Orchardson we believe, figures in his "Queen of Swords," a stately sword dance of the last century—a clever composition, but faulty in its colouring. Yeames sends his large work, "Amy Robsart," which we see has been selected by him as his diploma picture, as it is lent by the council of the Royal Academy. It is a powerful and dramatic work, most ambitious in treatment, and one of the few good historical subjects to be found here. His smaller pictures, "The Last Bit of Gossip" and "Pour les Pauvres," are excellent examples of his work.

One of the most attractive pictures in this gallery is the "Casual Ward," by Fildes—a painful subject, but one admirably worked out, and startling in its truth to nature. Another work, by a rising artist, is "Dawn," by Gregory—an able attempt to depict the grey twilight struggling into a ball-room still lighted up by candles. The light strikes upon an azalea in full bloom, before which, leaning against a piano, a couple of dancers are enjoying a flirtation. The drawing of the gentleman is almost unintelligible, but the effect of the light is well given, and the artist has fairly overcome the intensely difficult task he has set himself. In another of the small galleries we have, side by side, five of Leslie's best works. Here we have an instance of an artist haunted by a type of school-girl beauty,

a strange fashion of dress, and a quaint Queen Anne sort of architecture. Leslie's work is always delightful—his women are graceful and refined, and his indications of landscape are in sweet accord with the figures in which he enshrines them. One is tempted to wish he could have a chat with the damsels who are trying their fortunes by sailing roses along the stream, or who are concocting pot-pourri. We find the same charming girls in "School Revisited," and one of them looks most loveable in "Celia's Arbour." George Leslie lacks the solidity of work we so admire in his father, and he has a far different appreciation of colour. We rarely find a son following the profession of his father so wholly uninfluenced by his father's art. But for realisation of female beauty upon canvas we must give the palm to Calderon. His two portraits, "Constance" and "Margaret," are perfect, and the combined show of his works here proves how well deserved is his reputation. The stately princess "On her way to the Throne" is one of his best pictures, and "Home they Brought her Warrior Dead" is his most important work here. "Victory," a group of ladies and children looking on at a conflict from the battlements of a castle, pleases us less. Mr. Calderon, in conjunction with Mr. Leighton, arranged the pictures. Mr. Leighton, though one of those selected to send eight works, has contented himself with three, the best of which is "The Music Lesson," from last year's academy. "Elijah," a large and powerful work, has not been exhibited before. It is sad to leave so many fine pictures unnoticed. We have said scarcely a word with reference to landscape—an art in which our painters greatly excel—and must quit without having described the English water-colours, which more than fill one of the small side galleries.

ANIMAL REPRESENTATIONS.—THE GROTESQUE.

THE origin of animal forms in architecture is a matter of much uncertainty, and different hypotheses have been framed. In the article, "Animal," in the "Popular Dictionary of Architecture," by Messrs. Audsley, the writers venture the supposition that animal forms were the result of idolatry; that "man turned to the animal world to select some creature larger and stronger than himself, which he deified in his own imagination, and fell down and worshipped. But, as animals so large and powerful could neither be safely caught nor detained for his worship, he carved or modelled for himself rude representations of them, which he worshipped, in the first place, as symbols only of his adopted god, and in the course of time as his god absolutely." No one acquainted with the historical development of religious ideas, or of art, can doubt that the earliest mythologies furnished those barbaric and uncouth embodiments of animal forms we find in the architecture and sculpture of Egypt, India, and China; but the question of most interest is how far the severe conventional treatment observed in the ancient sculptures of the Egyptians was the result of symbolical meaning, and may be brought into requisition for architectural purposes. The Egyptians did not imitate the living animals which they worshipped; their sphinxes which adorned the entrances of their temples were quite unlike any real animal, they combined the human with animal attributes—hence we have the lion-headed, the eagle-headed, and the winged divinities. As we are told in the work just mentioned—"The architect is called upon to look with respect on the sphinx of the Egyptians, for in the entire range of his art the ingenuity of man has been unable to devise any treatment or combination of animal forms which so absolutely lends itself to the severity of the greatest architectural works." This is no exaggerated statement. However rude and barbaric the Egyptian sculpture may be compared with the more ideal and cultured conventional forms of the Greek artist, we cannot deny that it was essentially idealistic in treatment, and lent itself admirably to the grand and colossal masses which it was employed to set off. Power and grandeur were imparted also by the colossal scale of these symbolic sculptures, and no doubt the Egyptian artist reached, by an intuitive sense, aided by his idolatry, that higher conception of art that with the Greeks was the result of a more developed culture. Thus, as regards the arts of sculpture and architecture, extremes have met. By casting the images of their gods into superhuman types, by uniting the features of men and animals, as in the bull-god Apis, the ancient Egyptians imparted the attributes of supernatural power to them at the same time that they produced a purely conventional expression which every age has admired. Hence what was intended at first to convey a symbolic meaning, and to impart the attributes of power, may now be looked upon as a very near approach to the grandest idealistic representation. No other primitive sculpture has realised this ideal in the same manner. The idols of the South Sea Islanders, the North American tribes, and those of Scandinavian origin, display all the barbaric qualities of the most uncultivated races. They are representations of the most terrible shapes the imagination could conjure up—the mind at that early stage begins to embody the chimera of superstition, and the primitive fetish supplies the earliest model to the artist. Conceptions of the Deity naturally became the subject of the sculptors' earliest attempts, and it was not till they rose under the purer theogonies of the Greek and other nations, that we can look for any higher embodiments of divinity. The shapes assumed by early sculpture were intended to represent power, and to instil fear and terror. The late Sir M. Digby Wyatt has observed, "it would almost seem as though the uncultivated race felt that they could inadequately express divinity by simply imitating the forms of men, and that they sought refuge in the matter by adhering to the frightful types they had received from their forefathers." We have no doubt, in such an explanation, the clue to the origin of many of those frightful sculptures and grotesque representations found in later ages, and which some architects even now delight to imitate.

In the architectural works of every nation animal forms were largely introduced. Thus we have the winged bulls of the Assyrians, and the great hall of Xerxes was adorned with pillars, the capitals of which contained the well-known conventional representations of bulls. Mr. Fergusson has shown, in his "History of Indian and Eastern Architecture," numerous instances of the combination of architectural with animal forms in the Buddhist remains, and we way specially instance the sculptured capitals of the gateways of Tope, at Sanchi, the portico at Vellore, and the pillar in front of the Cave Temple at Karli. The elephant is largely employed in this manner. The "stambhas," or "lâts," were adorned with emblematic representations of lions and other animals on their capitals, and many of the forms found are highly conventionalised. The Japanese and Chinese artists have been masters of animal conventionalism, and, according to Messrs. Audsley, the most important of these are "chimerical, and represent the dragon—a scaly monster, with attenuated body and spinous back, long coiling tail, legs and claws, and a large ferocious-looking head armed with horns—a conventional conception based on a lizard form; the Kirin, an animal with the body and hoofs of a deer, but with the former covered with small scales, and the head of the dragon; the dog-lion, a beast with a large head and enormous mouth, well furnished with tusks and teeth, flowing or curly mane, bushy tail, and sharply-clawed feet." Nothing is known apparently of the period of the introduction of these fabulous monsters.

Passing over the classic period of architecture, during which animal forms were rarely introduced, we come to that most interesting of all periods, the middle ages. Symbolism and allegory played the chief part in the sculptured forms then introduced. In early Christian art we have the lamb and the lion—symbols too well known to need comment; but we must turn to French Gothic for the peculiar forms of grotesque animal sculpture. At the angles of towers, as gargoyles and buttress heads, we find remarkable instances of chimerical and hybrid monsters. We are certainly disposed to believe that all these forms were intended as personifications or symbols of human vices and passions. They were generally placed on the outside of the building, as if to symbolise the wickedness of the outside world, and to instil feelings of religious terror upon those who entered. So far was the practice carried that even St. Bernard wrote to the Abbot of St. Thierry to ask the meaning of such deformed creatures. Of course, we do not mean to deny that many of the grotesque carvings in bosses and capitals are purely fanciful devices, and no more beautiful instances of entwined foliage and animals can be found than those of Romanesque and French architecture. In the crypt of Canterbury we find many animals that appear to represent the human vices, and probably the legends of the middle ages furnished many of the ideas; the tympana of the doorways of continental churches teem with them. But we cannot find at this day a motive sufficiently strong to justify the adoption of such primitive means of conveying moral teaching as to represent ideas so repulsive and forbidding. It is certainly a singular kind of artistic degradation that racks the imagination for images of monstrous shape wherewith to decorate, or, we would rather say, disfigure our places of worship, and render the sculpture itself an object of terror to children's minds. Unless we can find attributes of a higher and more deiform character, we had much better leave sculpture till another school of artists can clothe our conceptions in a spirit more becoming the religious convictions of the age. In the mean time there is, we are sure, a large field open to the architectural sculptor, in taking for his models the earlier classical sculptures of the Egyptian, Greek, and Assyrian artists, and the purer symbols of an early Christian age. We, of course, should not like to see a naturalistic treatment adopted; a degree of conventionality in the limbs and expression; an allegorical rather than literal rendering is called for, and the fabulous creatures of ancient mythology seem to furnish us with all the elements in composition required to render sculptured representation again an accessory to architecture as it was of yore.

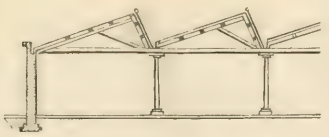
MILLS AND MILLWORK.*

OCCASIONALLY the architect is called upon to design, or rather more frequently to assist in designing, mills of various kinds. We scarcely need say such an uncommon call is more frequent in the midland and manufacturing districts of England than elsewhere, and whenever architectural aid is required the architect

* Treatise on Millwork. By Sir William Fairbairn, Bart., C.E., LL.D., F.R.S.A. Fourth Edition. London: Longmans, Green, and Co.

is more or less left to his own resources. There are no available treatises on mill architecture: it is one of those branches of the art that has to be learned from a kind of oral tradition in the secret keeping of millwrights and manufacturers. Architecture, as may be imagined, has been employed in the service of the higher departments of human life, in the building of temples and churches, in palaces and civil edifices; and the genius and spirit of the art have become so thoroughly imbued with the dogmas of creeds and the refinements of social life that it has actually lost sight of that great and increasing world—the utilitarian—which consequently has been relegated to the engineer. In former days the practice of mill architecture, such as it was, was confined to the millwright, who was, as Sir William Fairbairn tells us, the sole representative of mechanical skill—a kind of Jack-of-all-trades who could turn his hand with equal facility to the axe and hammer, the carpenter's bench, and the anvil. At any rate, the only treatise on mills worthy of the name is that by the late Sir William Fairbairn, of which the fourth edition is just published. With a good grace the author introduces his subject by calling back to the recollection the earlier days of mechanical science, when the self-taught millwright was the incarnation of ingenuity—the engineer of the district, who could calculate the power and velocities of machines, draw plans and sections of his buildings, survey, level, and drain, build bridges, and cut canals. Up to the end of the last century the millwright in country districts was builder, engineer, architect, and surveyor, and many of his erections we look upon now as skilful and unpretending if not artistic works. As Sir W. Fairbairn says, "the whole mechanical knowledge of the country was centred amongst them, and wherever sobriety was maintained, and self-improvement aimed at, they were generally looked upon as men of superior attainments and of considerable intellectual power." As with other trades, the introduction of the steam-engine, and the creation of a new class of mechanics in the shape of turners, fitters, and machinists, considerably reduced the emoluments and position of the millwright; but the author nobly defends this useful class from the charges that have been made against them, and declares that, as a body, there is not a more trustworthy or respectable class of men in existence.

We dip into Sir William Fairbairn's treatise at the section on the "Arrangement of Mills" (p. 391), in which a short chapter on the history of mill architecture is given. As the author observes, the early mills were little better than sheds; the industrial population were trained to war, and, with the exception of corn and fulling mills, there was little need of improved buildings. As intelligence dawned, and the working classes emerged from the thraldom of feudal tenure, demands for food and clothing became more numerous, and mills were enlarged, though the progress was very slow, and no attempt to take advantage of large water-wheels seems to have been made as additional wheels were introduced to meet heavier work. Singularly backward appears to have been the knowledge of economising motive power, for every pair of millstones and every pair of fulling stocks had separate water-wheels, and these were multiplied according to necessity. These water-wheels were arranged one behind the other, the axles or shafts being placed side by side, and giving motion to as many pairs of stones. Smeaton effected a change in classification, and concentrated the power; and the late John Rennie, in the Albion Steam Mills, which were built by him, improved upon the construction still more. Up to Smeaton's time, indeed, the impulse or velocity of the stream, and not its weight, was employed; hence the use of undershot water-wheels, in which the water is discharged against the float boards under the shuttle. The water supply of London in Smeaton's time was obtained by power from undershot wheels fixed in the tidal stream between the piers of old London-bridge. In 1824 the Catrine Cotton Works, Ayrshire, was the first to adopt the high-breast water-wheel, which brought about an improved system of water power. In this mill the two falls previously used were united—"the power was concentrated in a separate house equidistant between the two mills, and a line of shafts projected at right angles from the wheel, and conveyed the power to the machinery in each." In this plan the water-wheels and steam-engine were erected separate from the mill—a system now always adopted, doing away as it does with the old-fashioned sunk trenches and the necessary loss of mill room. Platforms and galleries are now erected round the wheel-house, from which the water-wheels can be inspected and easily repaired. One of the most interesting instances of a plan of such an establishment is shown in outline (p. 128), designed for a mill in Perthshire. It consists of a rectangular wheel-house for 8 wheels, surrounded by buildings in the form of a square 3 stories high, containing the machinery driven by the wheels, which machinery was communicated with by shafts which were intended to radiate from the wheel-house at right angles to the mills on each side. The plan was, however, never carried out.



One of the chief agencies in the improvement of mill architecture has been the necessity for long lines of shafting, in some cases—as in cotton mills—extending 300ft. or more. Formerly the operations of spinning, weaving, &c., were carried on in the cottage of the labourer, whereas now the economical modes of transmission of power have necessitated large buildings wherein these operations are carried on under one roof. The improvements made in cotton manufacture alone by Arkwright, Crompton, and others suggested large buildings, which have led to the employment of architects in their planning and design. The author traces these modifications in external design from the square brick buildings, without the slightest pretensions to architectural form, with ranges of commonplace windows, to structures relieved by pilasters, cornices, and other simple architectural features. Sir W. Fairbairn writes: "About the year 1827 I gave designs for a new mill of a different class, and persuaded the proprietor to allow some deviation from the monotonous forms then in general use. This alteration had no pretension to architectural design; it consisted chiefly in forming the corners of the building into pilasters, and a slight cornice round the building." This simple change, says our author, gave a new impetus to factory-building; it was copied in all directions, improved the appearance of the buildings, and produced in the minds of the mill-owners and the public a higher standard of taste. Architects were employed, and the façade of the factory buildings at Saltaire may be taken as the first result of the impulse given in this direction. We will not here discuss the question of mill architecture on æsthetic grounds, though, if we did, we should have much to find fault with the notion of making a mill appear a palace or anything else than it really is by the addition of façades in Classic or Gothic taste; but we concur with the author that much has been accomplished from a desire to elaborate with greater certainty the art of design, and that millowners have clearly seen the advantage of employing architectural skill in these frequently colossal undertakings. It is the general arrangements of such buildings that the architect has chiefly to rely upon for effect. The value and use of iron as a material of greater security against fire, the adoption of the shed principle or "saw tooth" system of roofing for the better admission of top light, and the introduction of fireproof floors, have all tended to suggest new forms of combination. The "shed principle" of construction in roofing, for instance, is found the most convenient form for cotton-spinning and weaving sheds. We give a rough sketch of this form of roof, which may be unknown to some readers. Until within the last 30 years, observes the author, cotton mills were built from 5 to 8 stories in height, the ground floor being used for carding, drawing, and roving, and the rooms above were appropriated to spinning by mules for fine yarn, or by mules and throstles. Since then the introduction of the power-loom and self-acting mule has given a new character to the form and dimensions of factory buildings. Power-looms are found to work better on the ground floor, and the yarn requires a certain degree of moisture to weave freely, not obtainable on upper floors. These wants suggested the shed principle, which is now generally adopted in cotton mills where the loom is employed. Then, again, the self-acting mule has, by the great saving of labour it has effected, led to the adoption of mules of double the width of the old one—the former being 80ft. or 90ft. wide—so that, as the author remarks, "the spinning mills of the present day are more like square towers or large lanterns, with considerable architectural pretensions, as compared with the uncouth buildings of former times." It is usual to attach a weaving shed, with its warehouses and necessary offices, to the square structure. A good example of such a cotton mill is given in Sir William Fairbairn's work, designed by Messrs. Fairbairn and Sons, and built for the Bombay Presidency. The plan is nearly a square, about 400ft. each way. The machinery and steam-engines are placed on one side in a central position, the main shafts and gearing being carried by stone or brick piers throughout the whole length of the building. The engine and boilers are divided from the main portion of the building by a straight wall, on each side of the machinery being the cotton stores, winding machines, cloth warehouse, &c. The entrance forms the centre of this side, and is opposite the machinery. The remaining portion of the structure is divided longitudinally into one wide centre compartment 190ft. in width and two narrower side compartments. In the centre are the throstles and mules, on one side the looms, and on the other the "cards," "slubbing" frames, &c. In this establishment are six boilers, each 32ft. long and 5ft. 9in. in diameter, and the engines are collectively 160 horses, and are calculated to work to 600 indicated horse-power. The building, except the machinery, is of one story, on the shed principle. We have above alluded to the roofs, 23ft. span, running lengthwise, the distances between the rows of columns being 23ft. one way and 12ft. in the longitudinal direction. This form of mill covers a large area, and would not do for cities like Manchester, where land is

dear; consequently the mills are situated in the surrounding districts of such towns. The author lays great stress on the value of the shed principle, though it is one that can only be applied where land can be had at a moderate rent; but, where this cannot be obtained, buildings of three or more stories have to be erected. The workshops at Woolwich and the Enfield Rifle Factory are designed upon the system of shed roofs, and the convenience of one-story arrangements in facilitating the passage of materials by rail or tramway on one floor is considerable. We have particularly dwelt upon the cotton mill because it illustrates the great revolution effected in mill and factory architecture during the last 30 years. Corn mills are described at some length. One erected at Constantinople, and another on the borders of the Black Sea, of 36 pairs of stones, are illustrated. The first great improvement was the system of having the millstones in a continuous line, instead of the old plan of stones ranged round a large spur-wheel. The advantages of this improvement are chiefly those of saving space, and conveniently disposing of the garners and feeding apparatus, and obviating cumbrous framework for the spur gearing. We cannot enter into the processes to which the grain is subjected—these and the mechanism are familiar to many—such as the garners for the corn on the upper floor, the screeners, the feeding pipes leading to the hoppers of the grinding apparatus, the creeper boxes and elevators, and, lastly, the dressing-machines. One of the corn-mills built by Messrs. Fairbairn consists of an assemblage of sheet-iron plates fixed to angle and intermediate pilasters on the outside, and to cast-iron girders which tie the building of three stories together. It has an arched roof of corrugated sheet-iron. For the heavy gearing a wall of masonry is built to enclose one corner of the rectangular structure and to form a foundation for the bearings. The transverse beams are supported at the middle by columns well footed on concrete. The corn-mill built by the firm in Russia in 1860 is illustrated. The plan is a long parallelogram of four stories, the stones (36) being placed along one side. Projecting from the centre of this side is another small building for the engine and machinery, the boilers being sunk underground in an adjacent separate building. The chimney is placed behind the engine-house, 40ft. distant, and is octagonal. The walls are at the bottom 3ft. 6in. thick, and taper 1ft. 3in. at a height of 140ft. We may further note that the power is given off at both sides of the pinion, which gears into a toothed fly-wheel. The main shafts on each side, giving motion to the millstones, are 8½in. diameter for 14ft. long, and then they taper to 7½in. and to 6in. The distances between each pair of stones is 5ft. 6in., and they are arranged in a straight line along one side of the building. The elevators for meal are at each end of building, and the shaft giving motion to the subordinate machinery in the different floors rises to the fifth story, giving off its power by bevel wheels. The dressing, bolting machines, and wheat bins are on the 3rd floor; the fourth story contains the screening machines and the garners for bolting machines; the roof story the separators and the hoists. The walls of the mill are shown about 3ft. 6in. thick, and are pierced by circular-headed windows at intervals of about the width of opening. Transverse girders cross the building, and rest on the piers every 9ft., and are supported in the centre of the building by columns. The length of these girders or the span of the building is about 40ft. The sections show the columns to rest on brick piers on concrete, and the floors to be carried on cross-beams resting on the girders, while the engine-house has its floors of brick arches on girders. All vertical and horizontal shafting is carried on cast-iron supports. We have no space to enter into the details of other mills, such as woollen mills, flax mills, silk mills, oil mills, paper, powder, and iron mills, which are all described, but have common principles of construction; nor the details of machinery, such as elevators, creepers, or archimedean screws for the horizontal transport of corn, separators, screening machines, smut machines, millstones and framing, feeding apparatus, dressing machines, &c., but the treatise gives every necessary detail required by the designer of mills. The earlier chapters of the book are devoted to the principles of mechanism—such as link work, connectors, wheel work; to prime movers in which, rainfall and evaporation, reservoir construction, weirs, discharge of water, water wheels, steam, and windmills are dealt with and discussed, after which the machinery of transmission is enlarged upon in detail. We more particularly refer to the illustrated details of "hangers," "plummer blocks" for carrying shafting from the ceiling, floors, and walls of mills, the means of counteracting the thrust of a pair of bevel wheels, and the framework necessary to be mastered in preparing details for engineers' work. The author's practical knowledge of mill construction for a period of more than half a century gives this chapter a special value, as most of the details of construction given are from his own designs. The treatise is profusely illustrated by wood engravings and plates of large scale drawings. We may more particularly mention the plan and sections of mill and engine-house at Saltaire, and large scale drawings of the engines, as illustrating the general principles to be observed in the planning of spinning and other mills, the construction of the iron floors, the fixing of the horizontal and vertical shafting, &c.—details many of which we shall refer to in another article. The treatise, which has already reached the 4th edition, is well printed in a readable type; the engravings are excellently drawn, and the work may be regarded as the most complete and exhaustive treatise on mill construction and the machinery of transmission the millwright and mill-builder can possess.

THE BRITISH ASSOCIATION.

THE annual meeting of the British Association came to a successful termination on Wednesday. We extract from the reports of the various proceedings several matters likely to interest our readers.

THE EXTENSION OF THE DUBLIN NORTH WALL.

On Saturday last an excursion was made for the purpose of inspecting the new North-wall, the additions to which are being made under the care of Mr. B. Bindon Stoney, M.A., C.E. Previous to 1865 the shipping quays of Dublin were, with the exception of a short length opposite the Custom House, founded at or close to low-water level, and when the tide was out the foreshore used to strip out a long way in front of the walls. To meet the demand for a greater depth than this, timber jetties had been from time to time constructed along portions of the North-wall, so as to give about 8ft. at low water in line of keel. The first real attempt at providing deep-water quays was commenced in 1864 by rebuilding nearly 700ft. in length of the east end of the North-wall quay, so as to allow vessels drawing 17ft. to lie afloat alongside at low water, but the most important improvements of this kind were not commenced till 1870, since which date 6,500ft. of quay have either been rebuilt or constructed where no quays existed before, so as to give depths of from 15ft. to 24ft. at low water, and enable the cross-Channel steamers to sail at fixed hours, independently of the tide, as well as allow the larger class of over-sea vessels which now frequent the port to lie always afloat. It was determined to extend the North-wall, and construct a large tidal basin, with 24ft. at low water inside and 22ft. along the river face, so as to float the largest commercial vessels at all states of tides. The masonry was commenced in 1871, and up to the present about 2,500 lineal feet of wall have been built on a novel principle, which avoids the trouble and expense of coffer-dams, pumping, stage, and other contemporary works, the expenditure on which frequently exceeds the cost of the permanent work to which they are merely ancillary. The new mode of construction consists in the use of blocks of masonry of unprecedented size in the foundation below low-water level. Each block is 29ft. high, 11ft. long, and 21ft. 4in. broad at the base, and weighs 350 tons; they are built on land, and about three months after completion they are lifted by a powerful floating shears and conveyed to their destination on the quay, where each block forms 11½ft. in length of the lower portion of the wall as far as low water level, and when a number of these blocks have been thus laid in position the superstructure up to the coping level is built over them in the usual manner by tidal work, the total height of the wall being 45ft. Besides the large floating shears for lifting and moving the blocks about, there is one other special appliance—namely, a diving-bell, also of unprecedented size and peculiar in construction. This bell, which weighs 80 tons, is used for excavating and levelling the river bed on which the blocks lie. The operation of lifting and setting a block is as follows:—The floating shears is brought bow-on to the block wharf during flood tide, and the lifting chains are attached to iron suspending bars, which pass through each block. The chains are then hauled in by the winches on board, and water is pumped into a large tank at the after-end of the vessel, to counterbalance the weight of the block, which is then floated away to its destination, and lowered into place the following low water, so that at one step 11½ft. forward of wall are built up to low level. The cost of both floating shears and diving-bell was under £35,000, and the whole of this was repaid in the first 600ft. of wall, by the superior economy of this system over ordinary cofferdam and pumping work, and the relative saving now amounts to about £16,000 per annum. The task attempted for the gratification of the visitors was that of lifting a 350 ton solid block of concrete, 29ft. high by 21ft. wide, and 11½ft. in thickness, and containing about 5,000 cubic feet of gravel and Portland cement. It was easily raised from its position by the floating shears, and was warped out by steam winches to deep water, where the block is suspended until the tide should favour its being laid in its destined position.

WATER SUPPLY.

The fourth report of the underground water committee of the British Association was read by Mr. De Rance, F.G.S., Assoc. Inst. C.E. The value of the Government geological maps as a basis for investigations in questions of water supply, and the areas occupied by permeable formations capable of yielding water in wells sunk in suitable situations, was stated to be no less than 26,687 square miles, which, receiving a rainfall averaging 30 inches a year, would yield up to wells not less than 6 to 15 inches per annum, or a daily quantity of not less than 240,000 gallons per day for each square mile of surface, or a total quantity far in excess of that required by the population of England and Wales. The great value of these supplies for the towns and districts of the Midland districts was insisted on for their purity, and from the absence of the strong Parliamentary opposition which is encountered in all large gravitation schemes, whether the water be proposed to be taken from natural lakes, as the Thirlmere scheme for Manchester, or from artificial reservoirs, as the proposal to take the sources of the Severn for Liverpool. The well-boring at Bootle, near Liverpool, 26 inches diameter, just completed for the Liverpool Corporation by Messrs. Mather and Platt, was described as of great interest, the boring having reached a depth of 1,000 feet without reaching the base of the new red sandstone. The committee expresses a hope that this boring will be continued, as it will settle several questions, not merely of local interest but of national importance, as to the water-bearing capabilities of the

lower beds of the new red sandstone at great depths, the character of the coal measures, which undoubtedly underlie Liverpool, and the depths to them. Amongst a large number of wells and borings alluded to in the report was one at Burford, near Witney, in Oxfordshire, where the coal measures, with a coal seam, were found present, under the oolite and triassic strata. These latter were also described as being present in the new boring of the Metropolitan Board of Works at Crossings.

THE PREHISTORIC MONUMENTS OF CORNWALL COMPARED WITH THOSE OF IRELAND.

Miss A. W. Buckland read a paper with the above title. In the course of her paper Miss Buckland said that the prehistoric monuments of Cornwall, believed by archæologists to be the work of the same race as those of Ireland, presented, in the midst of strong resemblance, certain points of difference which deserved the attention not only of archæologists, but of ethnologists. In both countries they consisted of tumuli, including chambered burrows and giants' graves, monoliths or menhirs, circles, cromlechs or dolmens, and holed stones, all probably sepulchral, and hut circles, cliff castles, curious caves and crosses, whilst in Ireland they found in addition earthworks called raths, and round towers. Long burrows, which were looked upon as the most ancient of burial places belonging to the stone age, were wanting in both countries, hence we may infer that the people who then existed in England and Scotland never inhabited Cornwall and Ireland, where the earliest burrows seem to belong to the bronze age, the mode of interment in Cornwall being chiefly by cremation; but these tumuli may not represent the earliest tombs in these countries. The late Sir William Wilde believed that the earliest pre-metallic Irish were the erectors of gigantic cromlechs covered with earth, whilst the menhirs in both countries were very ancient memorials of the dead, although not always covering a grave—"Pipers," in Cornwall, being of the latter class. Some of these menhirs were afterwards converted to Christian uses, while some in Ireland bear Ogham inscriptions. Circles in Cornwall are small as compared to Stonehenge, Averbury, and Carnac. Nine exist in the extreme west of Cornwall, but no avenues are traceable with them, the same fact having been observed of the Irish examples—they consist generally of 19 stones. The cromlechs of Cornwall are of the first standing order, but seem to follow no special rule as to the number of stones composing them. The chamber tumuli do not equal in size the great pyramids of Gowth and New Grange, although of the same general construction. The holed stones of Cornwall, which vary greatly in form and size, have their counterparts in Ireland, Scotland, and France, but the menautæ seem unique. Their use is unknown, but in Cornwall and Ireland they have a reputation as healing agents. From the difference in shape and size, they could hardly have served as doors to dolmens, like the Indian examples, but probably were associated with the god of healing of non-sepulchral monuments. The beehive huts form an important part. Several groups exist in Cornwall, apparently identical with the Irish cloughans in Kerry and Arran. The Cornish cliff castles and the Irish raths were both ascribed to the Danes, but they differ essentially in construction, the Irish raths consisting of earthwork only, while the Cornish cliff castles are three or more circles of uncemented stone heaped together to form walls. The crosses of Cornwall, with few exceptions, seem older and cruder than those in Ireland, and bear no inscriptions in Ogham, although there are on some hieroglyphic markings. It is noteworthy that the Irish round towers do not appear in Cornwall, although traditions of Irish saints are numerous there. All these monuments are generally ascribed to the Celts, but this is probably an error; some maps showing the distribution of these remains prove that in most countries they follow certain lines indicating the migration of certain tribes. The great cromlechs of Ireland are found chiefly on the coast, and similar groupings occur in almost every country, so that a map of the world wherein these are clearly marked would be a great boon to ethnologists. Two distinct types of skull—the one dolichocephalic, and the other brachy-cephalic—are found associated with the Irish remains, and although both are assumed to be Celtic, the term seems inapplicable to both. The construction of similar monuments in India belongs to the dark-skinned pre-Aryan stock. Attention to the distribution, with regard to the cardinal points, and the number of stones forming these monuments, is of considerable importance, as also their constant occurrence in bog or waste land. Their position appears to the author to have some connection with the point from which their builders first emigrated, and the rude hieroglyphics on some seem to denote the tribal marks or tokens of deceased chiefs.

THE PRE-HISTORIC SCULPTURES OF ILKLEY, YORKSHIRE.

Mr. J. Romilly Allen said the object of bringing the subject before the Association at Dublin was to enable the Yorkshire examples here described to be compared with those found at New Grange and in other parts of Ireland. The particular type of sculpture dealt with in the following paper was known as "cup and ring marking." Sculptures of this description were discovered in England in 1825, and subsequently in Scotland, Ireland, Wales, and Brittany. The most valuable addition to the information already collected was made in 1877, by Mr. Rivett Carnac, who found similar marks on stones amongst the Kamaon hills in India. The meaning of the symbols is understood by the natives, and is supposed to have reference to Lingam worship. Cup and ring marks in Great Britain are intimately connected with the burial rites, and therefore probably with the religious ceremonies of the ancient inhabitants of this country, since the symbols are frequently found carved on the stones of sepulchral circles and chambers, and on the cover stones of cinerary urns. A full investigation of the subject may throw great light on the nature of the religion which preceded Christianity in this country. Examples of prehistoric sculptures found in different localities should be compared, and the remnants of Paganism incorporated in superstitions and the Christian religion critically examined. The remainder of the paper was devoted to a description of the magnificent group of cup and ring sculptures found on rocks in the neighbourhood of Ilkley, Yorkshire.

EXCAVATIONS AT CÆSAR'S CAMP, FOLKESTONE, AND AT MOUNT CABURN, SUSSEX.

Major-General Lane Fox, F.R.S., read a paper entitled—"Report of the Earthworks Committee: Being an Account of Excavations in Cæsar's Camp, Folkestone;" and also on "Excavations at Mount Caburn, Lewes, Sussex." In the course of the paper the reader stated that on Mount Caburn a large number of pits were dug. They were found to contain iron implements and arms entirely of a late Celtic type, and pottery of three descriptions. The fact of these being of a late Celtic type was proved by the getting of the specimens after a considerable amount of digging, and the finding of British tin coins, which were extremely rare, and which were known to be of a late Celtic type. Then excavations were made through the rampart in order to ascertain by means of relics found on the old surface land what was the date of the first Roman camp. In the upper rampart, a quantity of British pottery was found, showing the probability that it was erected at an early time. In the outer rampart pottery of superior quality was found, by which means it appeared likely that the camp was first erected during the early British period, and was occupied up to the late Celtic period. Subsequently the adjoining camp of Ranscombe was cut through, and Samian pottery was found in the interior, showing that it had been occupied by the Romans; but in the body of the work nothing but British pottery was found, which proves that, though occupied by the Romans, it was not constructed by them. The Ranscombe camp may, therefore, have been utilised by the Romans, as suggested by Horsfield a long time ago, during an attack upon Mount Caburn. The paper referring to Cæsar's camp, near Folkestone, stated that by digging through the ramparts in the same manner as before, it was ascertained that the whole of the relics found in the body of the several ramparts were of the Norman period, nothing Roman or earlier having been found anywhere.

ART RELICS AND RELIGIOUS EMBLEMS.

On Monday, in the Anthropological section, Dr. J. S. Phene read a paper on the subject of "The Courses of Migration and Commerce traced by Art Relics and Religious Emblems," in which reference was first made to some remarkable sculptures of the oldest historical notice existing in the mountains of Asia Minor, particularly in the "Niobe" of Homer, Mount Sipylus, and the Sesostris figure at Nymplaio, and subsequently to the various colossal and other rock-hewn sculptures in the Sporades and Cyclades having affinity by similarity of style to those of Asia Minor. It was then mentioned that tradition showed that the religion of this part of Asia Minor was transferred to the south of Gaul in the ancient city of Massilia, now Marseilles, and thence consequently it spread over the west of Europe. This religion brought with it the idea of the colossal in the representation which probably accounts for the ancient colossal figures in Brittany and Britain, and the love for the colossal still found over the whole of that part of France lying between Marseilles and Brittany. The old route of the tin traffic between Britain and the Mediterranean, and some discoveries on this route in the South of Britain and the South of Ireland were referred to as tending to the conclusion that the articles discovered were introduced by Oriental, probably by Phœnician, traders. One of these was a sculptured human head in the exact style of Assyrian art as found at Nineveh, and which was discovered some slight distance under the surface, on the estate of the Earl of Mount Edgcumbe, who had drawn the attention of the author of the paper to it, and furnished him with a photograph. Another was a bronze mask or head, found in a bog in the south of Ireland, near the Galtee mountains. The bronze represented the head of a cow, and had a close resemblance to the head found by Dr. Schliemann at Mycenæ, which he identified as the head of Hera. The Mycenæ relic was a silver head with golden horns, and the head found in Ireland was a bronze one, with the horns (missing) made to screw on and off, thereby clearly indicating that they were capable of being taken off for security, and were, therefore, no doubt also golden. In the mask found in Ireland the tongue protruded, indicating sleep or rest, and this symbolism was further exemplified by the crescent moon being placed beneath the sun disc, and so indicative of her rest or sleep—a strong similitude when taken in connection with the well-known appeal to the priests of Baal, who must have represented their deities in action or occupation, "cry aloud, for if he is a god either he is talking or he is pursuing, or sleepeth and must be awaked." Dr. Phené, who had gone carefully over the whole of the districts referred to in Asia Minor, Greece, the Levant, and the complete course in France, found a cow's head sculptured in Pharos, and another on part of an ancient temple now forming the lintel of a Greek church near Amyclæ, not far from Sparta. Another object represented a fine bronze figure of a deity shown to be the Tyrian Hercules, found at Vienne, near Besançon. The deity bore on its head an enormous crown composed of hammers, the number of which agreed with the united number of the Kabiees of Samothrace and the Cyclops of Sicily, their occupation being the same—namely, that of metallurgists. Dr. Phené considered they represented the same personifications but lost the attributes of divinity, as these traditions were brought westward.

RIVER CONSERVANCY AND WATER SUPPLY.

Mr. Edward Easton, C.E., in his address before the Section of Mechanical Science, adverted to the necessity of the regulation of our water-sheds and the conservancy of our rivers and streams. By this phrase he meant the treatment and regulation of all water that falls on these islands from its first arrival in the shape of rain and dew, to its final disappearance in the ocean. First Mr. Easton gave a sketch of the early attempts made to regulate and control the waters of rivers, reverting

to the accounts given by Herodotus of certain embankments to control the Euphrates, similar works by the Greeks and Romans, in which subterranean channels or tunnels were formed (as the *emissarium* from the Alban Lake—a Roman undertaking), Roman works in Britain, Holland, and other parts, and passing on to notice the legislation to protect riparian interests. He combatted the common idea that the ancients were ignorant of the hydrostatic law that water finds its own level, and he notices in proof the work of Frontinus, who preceded Agricola as governor of Britain, and was Curator Aquarum under Nerva and Trajan, entitled "De Aquæductibus Urbis Romæ;" also the aqueducts of Herod for the supply of Jerusalem, which crossed a deep valley by stone pipes under pressure. Mr. Easton's historical allusions are very interesting, and prove that the ancients adopted the very principles he now advocated. River conservancy began to excite interest in the reign of Henry VIII., when a public statute was passed. The drainage of the fens, and afterwards the canals, were undertaken, and the latter helped to take off the surplus water; but the greatest hydraulic works in England were those connected with navigation. Manufacturing activity introduced river pollution, and the conflicting demands of sanitary regulation have led to the present complication of affairs. Mr. Easton referred to the legal enactments of Solon, Plato, and the pandects of Justinian, dealing with the administration of common law to running water, showing that our riparian legislation is by no means new. He also observed that royal commissions and select committees had confined their attention to particular branches—as river pollution, water supply, drainage, &c.—but that the subject as a whole had not been grappled with until the appointment last year of the Duke of Richmond's select committee. Two objects, however, had been omitted from their report to the House of Lords. Passing on to the general principles recognised as essential by all authorities—leaving for other papers the details—Mr. Easton lays down the following general propositions:—That the freer the admission of the tidal water the better adapted is the river for all purposes; that its sectional area and inclination should be made to suit the required carrying power of the river throughout its length, both for the ordinary flow and for floods; that the downward flow of the upland water should be equalised as much as possible throughout the year; and that all abnormal contaminations should be removed from the streams. In some watershed areas reservoirs are suggested to equalise the flow and reduce floods; in others, embankments may be formed to control the water, or weirs and sluices delivering into side channels parallel to the main stream, and every river must be treated separately. Mr. Easton suggested what we have only lately done, a systematic collection of data bearing on rainfall, geological character of gathering grounds, the volume of each stream being found for each watershed by a course of observation; and self-acting tide-registering gauges at different points of every outfall should be provided to aid in the determination of the phenomena of every watershed. The incidence of taxation might be determined in the same manner; thus, when the geological strata of a watershed varies, one part being permeable as chalk, and another impermeable, such as the tertiary clays or shales, the same works would not be adapted to each section of the river, nor would an equal taxation be fair in such case. The permeable strata should be regarded as the provision nature has made for storing surplus rainfall, and wells might be dug through the overlying impervious layers. Two kinds of water supply are strongly recommended—one for dietary, and the other for culinary purposes; and compensating reservoirs, not necessarily watertight, are suggested; or a series of open weirs, which would collect water in flood time, and discharge it gradually, such as used by the French, and called *barrages*. Allusion is made to the great value of water-power allowed to escape every year in the shape of floods, and the need for utilising it, the example of France being pointed out for imitation in this particular, and the maps and data she has furnished—the work of the late M. Belgrand, inspector-general of the Ponts et Chaussées, to wit. These observations have been published as diagrams. The author proposes a public department analogous to those in France and Italy—a water department which should at once address itself to the remedy of evils, and which should have the control of every watershed and of all estuaries and navigable channels. The recommendations of the select committee, presided over by the Duke of Richmond, were endorsed by the section, and the following are quoted from the report:—"That to secure uniformity and completeness of action, each catchment area should, as a general rule, be placed under a single body of conservators, who should be responsible for maintaining the river from its source to its surface in an efficient state. With regard to tributary streams, the care of these might be entrusted to district committees, acting under the general direction of the conservators; but near the point of junction with the principal stream they should be under the direct management of the conservators of the main channel, who should be a representative body constituted of residents and owners of property within the whole area of the watershed." We commend Mr. Easton's main conclusions to all interested in the value of our watersheds as sources of health and power. The more we restrain and control the rainfall in time of flood, the greater will be its value in a sanitary aspect.

FLINT IMPLEMENTS IN EGYPT AND MIDIAN.

In the department of anthropology, Captain R. F. Burton read an interesting paper on "Flint Implements in Egypt and Midian." The flints, he remarked, found in these countries had been the cause of a protracted controversy, the question in dispute being whether they were natural or artificial flakes, and, if artificial, whether they belonged to a prehistoric age, and proved the existence of a stone age in Egypt. A gentleman, who was recently travelling in Egypt, writes to a newspaper to the effect that he had found some flint implements very like those which had been used in Western Europe, and adds that the only question was whether or not they were of ancient date, and he was replied to by another gentleman who argued that the flints were not artificial, but formed by the action of the temperature. Also, while literary men were debating the question, practical men were in the country working in the same direction. Some results of these searches Captain Burton now exhibited. Some flints were artificial, and some undoubtedly of a natural formation. People should be careful in purchasing flints of the Bedouins, who were at present producing them in enormous quantities. He exhibited some implements for manufacturing purposes which he picked up in Midian. These were found chiefly in the neighbourhood of mines, and there were many of them strewed about. They were all broken. He had the honour to produce for the first time the coins of Midian, which he believed had never been brought home before. They were found all pasted together, but by the aid of an acid he had been able to produce very good results, and could show coins in fair condition. Most of the coins had on one side an eye and an inscription, and on the other an animal, the race of which he could not distinguish. Certainly it did not belong to the earth, nor to the waters under the earth. He had found in Midian a substance which he mistook for silver, but which turned out to be only antimony.

THE ARCHITECTURAL ASSOCIATION IN YORKSHIRE.—II.

Continuing our notes on the places visited last week by the annual excursion party of the Architectural Association, we find Hedon, Burstwick, Keyingham, Otteringham, and Patrington on the programme for visits on Wednesday by carriages. Unfortunately the weather early in the day was exceedingly wet, so that a start for Hedon had to be made by train, instructions being given for the carriages to follow in the event of the rain clearing off, which it did rather before twelve. Altogether Wednesday proved the most enjoyable probably of all the seven days' excursions, notwithstanding the wet of the morning, and thunderstorm of the return journey as the excursionists reached Hull. Hedon Church is a fine cruciform building, with a magnificent tower rising above the crossing, which certainly was by far the finest example, both for general proportion as well as detail, of any seen by the visitors during the excursion, not excepting the tower of Howden Church, which was visited on Thursday. The foundation of Hedon is apparently of 13th-century date, about 1230. The south transept doorway is of somewhat earlier character, round-arched, with peculiar detail worthy of note. No Norman remains are to be found, and the south transept is evidently the earliest portion of the building. The church remains much as it was left in the 15th century, with the exception of the destruction of the chapel to the transept and south side of the choir. Part of the south transept has recently been rebuilt under the direction and from the designs of Mr. G. E. Street, R.A., and we cannot but think that the heavy character of the new portions scarcely harmonise with the comparative refinement of the old work; while the new gable, with its pinnacles, on the east wall of the choir, by an architect, said also to be a local publican, is simply as bad as well may be. The west window is but little better, being thin and wiry in the mullions and lumpy in the tracery. The new reredos, whoever did it, is very bad indeed. The only feature in the entire restoration that one can be thankful for, besides of course the building being made weatherproof, is the fact that the old portions have not been scraped or tooled, the new work simply being inserted where required. Want of space will prevent our going much into detail, so that we must content ourselves with leading notes. The south respond of the western arch to the south transept is exceedingly good, and perhaps the earliest portion of the church. The original arcade of the nave was intended, if not executed, to have been at a much lower level than the one now remaining, as may be seen by the responds of the eastern bay next the crossing. The tower piers were inserted in the 15th century, covering much of the earlier work; before this a spire may have existed. The building of the nave evidently was commenced at the east, and carried westward. It is a fine type for a good parish church. The clerestory is simple, of small two-light windows. The aisle windows are of Geometrical in form for the most part; but the gem, so to speak, of them all, is the very fine flowing traceried window on the north side. It is illustrated by the late Mr. Edmund Sharpe, we believe, in his "Examples of Decorated Windows," and we agree with Mr. James Fowler in the opinion which he expressed when conducting the party over the church the other day, that it is one of the most perfect examples of window tracery design to be seen anywhere of the size and period. The font is a fine bowl, but wants a better pedestal. The design of the west front is a very pleasing composition—the buttresses are boldly treated with niches and traceried canopy gables. It is in looking at the exterior of the west front that the poorness of the new window in the centre, already referred to, is observed, notwithstanding the fact that its forms are based to some extent upon those of the aisles. The tower externally deserves careful study. It is of two stages above the roof. The lower is filled with two three-light windows, panelled only, and separated by a broad flat buttress, and similar buttresses on the angles. These are continued up through a portion of the belfry stage, where they finish with enriched gablets, the angle ones being continued up anglewise at a smaller size, while those in the centre continue in like scale only at right angles as before. All terminate in pinnacles through the unusually but not too deep parapet of two stages. The belfry windows are of three lights, with rather acutely-pointed arches and good tracery. The lower portion is filled in solid some few courses above the sills. If there is one fault to find with the design of this tower it is that the width of the openings of the two stages is the same; we think the design would have been improved if those of the lower stage had been smaller, and perhaps more simple in character. The chapels south of the choir must have been very rich examples of the best period

of Gothic architecture, but these were cut away, as may be seen, to make room at some period for the almost Tudor vestry, which, nevertheless, is a picturesque specimen, suitably treated. By a drive the excursionists hastily reached the small and not very interesting Church of All Saints at Burstwick, where the vicar had kindly arranged a little sort of reception, as the ready sexton performed a selection on the barrel organ while the visitors walked up the nave. The church is in a very dirty condition, part of the west end being used as a kind of garden-room or workshop. Tinsel decorations of the Christmas-tree type only make the dust more noticeable, while the bad-coloured glass, as well as the singular oil-painting over the altar, are certainly unworthy of the beauty of holiness. The church consists of nave, with north aisle, chancel and sacristy, small south chapel, porch, and west door. The chapel is of Geometrical Decorated work, and is the most interesting portion of the church, which is well situated midst trees and ivy. The vicarage is close by, and seems well cared for. Between Burstwick and the next place of halting—viz., Keyingham—a frugal lunch was obtained on the roadside from the hampers carried in the first van. Refreshed in this way, and with bright sunshine after the rain, the excursionists were in good trim to see the almost unique tower and broached spire now soon reached at Keyingham. It is of late thirteenth-century date. The peculiarity consists not so much in the size and form of the tower as in weathering to all the courses on each face. We do not think the effect is pleasing. The tower is of four stages. The lower one is plain on all sides, excepting on the north, where there is a small doorway. A window on the west pierces the second stage; the third stage is a blank, and the fourth is pierced with two light lancet windows. The quaint chapel on the south, with its square-headed two-light windows and flat gabled roof, is well deserving of note as a study in colour and picturesqueness. The old roof remains over the nave, with some good bosses. The nave arcade is of four bays of early fourteenth century work, sadly mutilated in the piers to make room for the central arena-like treatment of the late eighteenth century pews, which now unite with the three-decker pulpit in blocking up the church. The altar is a very small and mean deal table, too slight for common kitchen use. Altogether, in the old portion of the church there is much well worthy of study, and for its purpose the church is a good type of work; but careful restoration is sadly needed, and we believe such a work is in contemplation by the vicar, who informed us that want of funds alone prevented the work being proceeded with. Some time was lost here by the pressing anxiety of those who received the excursionists to show them some few old relics which certainly had but little more than a local interest. Making up for lost time, a hasty visit was made, after a short drive, to the parish church of St. Wilfrid, at Otteringham, with its prominent tower and spire, which, like the splendid spire of Patrington, yet to be seen, form such conspicuous objects in the landscape. The earliest part of this church is the tower arch, of good Transitional character. The nave arcade was rebuilt in the fourteenth century, which is the date assigned for the south aisle and transept, the north aisle being a century later in style. The curious way in which the moulding of the caps finish at different levels on the same piers is worthy of note, and certainly is not cleverly managed. Fine corbels of sculptured figures remain in the south transept, and a singular desk on the north wall should be noticed. The old roof has given place to a flat one, but the earlier pitch is recorded by the original weathering in the tower. The present parapet to the tower has been built up, covering the base of the broached spire, quite spoiling its original proportions. The corbel table of nave is very coarse, the corbels being too large for such a position. We will now pass on to the next halt, where, according to the programme, three hours were to be spent, so important an example of English architecture was the church of St. Patrick at Patrington considered; and, indeed, three days could easily be spent with profit by the ordinary student at such a church. Hearty regret was expressed that the delay of the morning, already referred to, should have reduced the intended visit of three hours to little more thon half that time. However, the best of the time available was made, and the party welcomed by the presence of the vicar and his clerk. The chancel of the church has lately been restored, else the church is much in its original condition as far as the main structure is concerned, though, of course, eighteenth-century pews of loose-box and private-stall character block up the building in an uncomfortable way, notwithstanding the padding and cushions of some of them. Coals and *débris*, with brushes and pails, keep an old joiner's bench company in the south transept, while dust throughout seems to defy the truth of the saying that "cleanliness is sister to godliness." We should be sorry to see anything done to the church beyond cleaning and re-seating it, and, of course, rendering it more suitable for its purpose, as well as weathertight. With these remarks we will pass on to the description of the building architecturally, and we find it to be an exceptionally fine 14th century church, cruciform in plan, with a central tower and spire about 170ft. high. Mr. Fowler gave the dates of 1300 to 1360 for its erection, and this will allow a good margin for the several details observed. The chancel is nearly as long as the nave; it is of four bays, and its style is rather later than the western limb. The boldly-projecting buttresses, with elaborately carved pinnacles and plain parapet, deserve more than a passing remark, especially with regard to the spiritedly carved gargoyles, some of which remain in admirable preservation. The east window is an insertion of Perpendicular date in the Decorated jambs, the lower part being solid. The spacious character of the church in the interior immediately forces itself upon the visitor on entering, and this is largely due to the lofty aisles to both sides of the transepts, and the peculiar lengthening of the chancel in continuation of the eastern aisles just mentioned. The eastern aisle of the south transept is the only one still retaining its original groining, and here is placed the charming Lady chapel, now a convenient place for a common stove. The figure of our Lady originally here is now found below the exterior of the east window of the chancel outside in a sadly mutilated condition, while her shrine has been nearly destroyed. However, for all this, the Lady chapel is well worthy of special notice, and deserved the careful sketches made but too hastily on the occasion of our visit. The exterior of the chapel is quaint, but its roof is not well done, though an arrangement for throwing the sunlight through the groin boss on to the centre of the shrine to the figure of our Lady is perhaps novel, though, if true, unworthy of so sacred an edifice. The staircase over the arch in the south transept to the tower is unique in one way, and no doubt is original, while the corbelling out on an arcade of the side walls below the tower to bring the crossing square, was remarked upon by Mr. Fowler, when describing the building which he did here as elsewhere in a concise and thoroughly practical manner. The excursion was not an archæological one, and the contrast between the archæological view of buildings with the architectural was brought forcibly before us this week when at Ely with the British Archæological Association. Comparisons are always invidious, but at any rate, however different the objects of the two bodies may be, in no instance does the difference probably appear more widely marked than in the manner in which they each behave while within consecrated walls. We never saw architects treat an altar as if it were a hall sideboard, as was done in the Lady Chapel at Ely, notwithstanding the beautifully embroidered frontal with which it was covered. Returning to Patrington we find the original timber roof over the transepts as well as the nave, and glancing up the chancel we observe an eastern sepulchre as well as a sedilia and piscina. The carvings, however, have been recut during the recent restoration. The font is near the chancel screen, and the pulpit is Jacobean, if we remember rightly, and has a sounding board over. The nave is of five bays, richly moulded, with clustered piers and carved caps. There is no west door, but there are porches north and south at the second bay of nave. The spire and tower are illustrated by Wicks, but he makes the structure too tall in proportion. The work is one of great beauty, and, although in detail so different to Salisbury, yet at a distance the two examples seem identical. The tower at Patrington is plain, but the springing of the spire is enriched by a corona of sixteen compartments, remarkable for height and pleasing effect. The old lead remains on the roofs. The time for leaving has now arrived, to return to Hull by a most enjoyable drive of rather more than twenty miles. For the visits of Thursday we have only space for little more than very general remarks, and as both Selby Abbey Church, as well as Howden, are so well known, a detailed description is not necessary. Reaching Selby by ten o'clock, the vicar at the abbey had arranged morning prayer for the benefit of the party, after which Mr. Fowler went carefully through the beautiful building with the visitors. After three hours spent in sketching lunch was obtained at the Londesborough Arms Hotel, close by, and Howden occupied the remainder of the day. The beauty of both these buildings cannot be well over-rated, while the chapter-house at Howden, even in its ruined state, is one of the choicest remains to be found of the kind in the three kingdoms. Mr. Edmund Sharpe devoted many of the plates in his "Architectural Parallels" to the illustration of this fine church. The work dates from 1260-1270 downwards, and sufficient remains of the ruined choir to show what a magnificent series of buildings must have originally existed. By no means a second-rate building is the new market-house, in red brick, in the square near the church. Thursday, with such a rich programme as was furnished by the two churches above alluded to, was one of the most profitable of the whole series. We hope to conclude our notes next week.

In describing Cottingham Church last week "angular" should have been printed "singular;" "cross" should be "brass;" and "fine" bays should have been "five" bays.

M. B. A.

ARCHÆOLOGICAL.

Newbattle Abbey.—Whilst preparing of some additions that are being made to Newbattle Abbey, the workmen recently came upon what has proved to be the foundation and base of a chapel in an excellent state of preservation. The whole of the foundations have been excavated, the result being that the basement of a building 260ft. long and about 67ft. broad has been discovered, with numerous pillars, which are supposed to have supported a groined arched roof similar to that of the crypt at present in course of restoration in the Abbey, and which is supposed to have been built about the year 1140. It is also evident that this crypt must have had a connection with the chapel, as a passage from the crypt to a doorway exactly in the centre of the south wall of the chapel is distinctly observable, and in this doorway part ofone of the footworn steps still remains in its position. The walls vary in thickness from five to seven feet. It is evident that the building must have been burned, as many of the stones that have been dug up bear traces of having been subjected to strong heat. Many elaborately carved stones have been found, and these, with the beautiful moulded work to be seen on fragments of the groined arches and pillars, prove that the masonry must have been of a very superior nature, and in style akin to that of Melrose and Kelso Abbeys. Remnants of the tiled floor, which had been laid in diamond form, are also to be seen. The walls were discovered at an average depth of from two to three feet from the surface, and over a part of the north wall are spread the roots of a gigantic tree.

Last Saturday the memorial stone of a new Congregational school was laid by Henry Lee, Esq., J.P., of Manchester. The school is one story in height, and contains accommodation for upwards of 700 children, allowing 8ft. of floor space for each child. The plan shows a mixed school, 73ft. by 35ft., an infants' school, 54ft. by 30ft., a babies' school, 30ft. by 15ft., and five class-rooms, each 15ft. by 14ft. The work is being carried out by local tradesmen, from the plans and under the supervision of William S. Varley, New Market-chambers, Blackburn.

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ILLUSTRATIONS.

DESIGN FOR MURAL DECORATION—ST. JOHN'S CHURCH, EGREMONT—BUSH HOTEL, AND SHOPS, CARLISLE—VILLAS AT GUNNERSBURY—CHRIST CHURCH, NORTH KENSINGTON — MR. GRAYSON'S DESIGN FOR THE BROMPTON ORATORY CHURCH.

OUR LITHOGRAPHIC ILLUSTRATIONS.

DESIGN FOR MURAL PAINTING.

The subject from "Ivanhoe" in our illustration, drawn by T. Howes, of Surbiton, is done especially for wall decoration, and could be painted in any manner most suitable to wall or style of the house, or on the proper canvas for painted tapestries, either to be strained on a frame and fixed with a moulding round it, or hung on the wall in the usual manner (see letter on page 640, Vol. XXXIV.).

VILLAS ON THE GUNNERSBURY ESTATE.

This estate is five miles from Hyde-park-corner, and of easy access to town. The District, North-London, South-Western, and Metropolitan railways run on to the Estate. The soil is gravel, and it is well drained. During the past three years this estate has grown very rapidly. The houses are all of the better sort of middle-class residences in various styles. A great deal of Queen Anne's work is being carried out, and the drawing we illustrate this week is a design for a series of corner houses on the estate. The estimated cost of these houses is £1,100, and the houses are well and substantially built. They are being erected by a local builder, under the superintendence of the architect, Mr. Richard Tomlinson, of Gunnersbury.

ST. JOHN'S CHURCH, EGREMONT.

This church, of which we give an exterior view, is about to be erected in an outlying district of the parish of Egremont, in Cumberland. A suitable site has been given by Mr. Henry Jefferson, of Springfield, in a corner of his park which abuts on the main road from Egremont to Whitehaven. The church is intended to be built of the local red stone, and roofed with green Westmoreland slate. It will provide accommodation for 250, and is capable of future extension, and has been designed by Mr. C. J. Ferguson, of Carlisle, architect and diocesan surveyor.

BUSH HOTEL AND SHOPS, CARLISLE.

The new block of buildings is erected on the site of the old Bush Hotel. It is built of tooled red stone, in four stories in height, exclusive of basement and attic floors, and fronts to three streets—namely, 36ft. to English-street, 65ft. to the Viaduct, and 36ft. to Blackfriars-street. The style of architecture is that of the Stuart period, and the building is surmounted by a Mansard roof. The cornice all round is inlaid with white tiles, decorated with floral designs, and these, while forming a striking feature in the elevation, obviate the heavy appearance that would otherwise be imparted by the roof. Altogether there are six floors. The architect is Mr. C. J. Ferguson. The builders are Messrs. Beaty Brothers.

CHRIST CHURCH, NORTH KENSINGTON.

We this week give an illustration of the successful competitive design for this building. The church will be built of the most inexpensive materials, used in a way to avoid labour (and therefore expense) as much as possible in the work; the building, therefore, relies for effect almost entirely on good proportion and the future use of stained glass and colour decoration. A full description of this design of Mr. Cutts's, as well as of some of the other competition drawings, will be found in the Building News for April 26, 1878.

THE CHURCH OF THE ORATORY, BROMPTON.

We this week illustrate Mr. G. E. Grayson's design, which was placed in the foremost rank in our review of the drawings submitted in the recent competition. Mr. Grayson, in his report, states that he has designed the church in the earlier style of the Italian Renaissance, before what Mr. Fergusson, in his "Modern Architecture," calls the mania for the Classical orders, set in. He proposes to use terra cotta extensively, especially in the interior of the building. The cost, exclusive of marble and mosaic decorations, was estimated at £50,000.

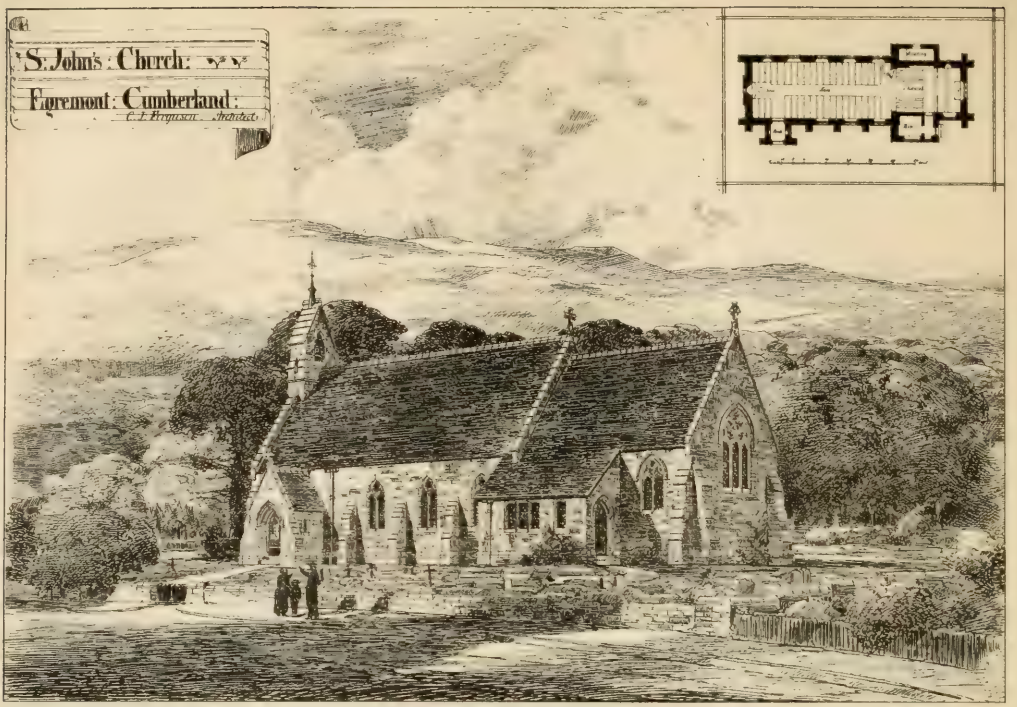
TINTERN ABBEY.*

Guide-books are not invariably the most reliable of compilations. They have a reputation for looseness, if not inaccuracy, of description, occasionally atoned for, it is true, in the estimation of general readers and tourists by a high-flown and stilted style. Guides to our abbeys and cathedrals are generally of this class, written by men who have no special knowledge of their subject, advertising booksellers, and others who make it a kind of a card to facilitate business. Exceptions to this rule are worth noticing, and we have now on our table a small sixpenny guide to Tintern Abbey, published by Mr. R. Waugh, of Monmouth, and written by a Fellow of the Institute of British Architects—a fact that ought to set enterprising publishers on a new track of guide-book literature. Mr. Blashill, the author, is a gentleman who has devoted some time and study to the fine old Cistercian abbey on the banks of the Wye. This little guide-book is a developed form of Mr. Thomas Blashill's recent description of the abbey to the Woolhope Naturalists' Field Club, a report of which we gave last year, and it just covers ground enough and goes sufficiently into detail to make it a very instructive companion to the tourist who desires to become acquainted with the history of the establishment, and the intention and use of the various parts of the ruin. We need hardly say the author supplies a small key-plan to the church and monastic buildings, without which a guide book is absolutely useless, and a few woodcuts, which, however, we should have liked to have seen a little better drawn. The present buildings were founded by Roger Bigod, Earl of Norfolk, in 1269, a descendant of the De Clare family, though a previous abbey was due to Walter de Clare, and is assigned a date as early as 1131. Nothing is said about the earlier edifice, though it is probable the present remains are a completion of the original plan. Mr. Blashill's description of the abbey church points out the general and special beauties of the transitional form of Decorated which it displays to such perfection; besides which the monastic orders are sketched and the peculiarities of the Cistercian life and habits clearly given. Referring to the church—the prominent feature of the group of buildings—the author says there was no tower, "though it is probable that the walls over the arches in the centre of the church were carried up just above the ridges of the four great roofs," and the absence of it would appear to be one of peculiarities of Cistercian churches. We find the same at Netley—a very similar example of a Cistercian monastery—in which case, also, the aisles to the transepts are confined to the eastern side, as at Tintern. Another peculiarity of the latter is the absence of a western porch or arcade. The rigid austerity that characterised the Cistercian mode of life is reflected in the extreme simplicity of their buildings, and we find this quality at Tintern and all monasteries of the same order. Mr. Edmund Sharpe—by the way an eminent authority on Cistercian architecture—has well described the singular absence of decoration and colour in the works of this order, and we may refer the reader to the Building News (Vol. XXVII., p. 386) for a fine elevation of part of the nave of Tintern, reproduced from Mr. Sharpe's well-known "Parallels." Mr. Sharpe, in this work, also shows a restoration of the east window. The high screens of Tintern are another peculiarity. "In no other church," says Mr. Blashill, "do we see this division so clear and complete as it is here shown by the high screens that run through every part." These divide the nave and aisles, and the transept chapels from one another; but the exact position of the western, or rood screen which closed off the monks' choir is not yet satisfactorily determined. We should rather place it in a line with the main piers to the west than one bay further, as shown here. The author mentions the fine coat of white plaster observed over the walls of the interior, and the red lines to be traced in some parts of the south transept, intended to imitate stone jointing. We notice the same plastering and colour at Netley. As in most churches of the order, there were three altars at the eastern end of the chancel, besides those in the transepts. Mr. Blashill points out the difference in the style of the masonry and window details; and also the unique position of the cloister garth, with its surrounding buildings on the north side—a point that has been well discussed by Mr. Mackenzie E. C. Walcott in our own pages, and which, no doubt, was determined by the fall of the land. Tourists generally get puzzled when they leave the church and enter the cloisters and the surrounding apartments. These are explained fully in the guide-book, so that a stranger need not have to ask. It is a pity the key-plan numbers are not referred to, however, as this clue would add much to the clearness, and prevent the possibility of a mistake. The small apartment adjoining the transept is called by different names, though we are inclined to adopt Mr. Sharpe's nomenclature, and call it a penitentiary, the chapter-house, with its beautiful triple-divided vault, the library or parlour, the "slype" or passage, the fratry or day-room, an apartment divided by a centre row of pillars having dormitories above, another apartment designated by some a calefactory or winter parlour, the dining-room or refectory, with its hatchway for food and its lockers; the kitchen, now much altered; and the long apartment on the west side of cloisters for the *conversi* or lay brethren, with dormitory above, are all described, though some of these are more or less conjectural in their appropriation. Brief chapters on historical notes and on the monastic orders conclude the work. As Mr. Blashill says, the materials available for a history of Tintern are few, the library of the Earl of Worcester having been destroyed at the capture of Raglan Castle. In this small *brochure*, however, the visitor to the ruins will possess a reliable and clearly-written guide, giving him the more interesting features of the abbey from the unmistakable evidence of architectural data.

* Guide to Tintern Abbey. By Thomas Blashill, F.R.I.B.A. Monmouth: R. Waugh, Church-street.

TRURO CATHEDRAL.

A novel form of competition has just taken place in connection with the proposed new cathedral for Truro. Although Mr. St. Aubyn prepared a design for the new building nearly twelve months ago, a limited competition among a few leading architects was determined upon by a meeting of the subscribers held last spring, when an executive committee was elected. The following architects accepted the offer to compete—viz.: Messrs. St. Aubyn, Bodley and Garner, Burges, Pearson, Pullan, J. O. Scott, and G. E. Street, R.A. Each competitor had the option of either submitting a special design for the proposed cathedral, or sending in drawings of a selection of his executed buildings. The executive committee, after carefuly examining the drawings sent in by the above architects, have selected Mr. J. L. Pearson, A.R.A., as architect for the new building. Mr. Pearson prepared no design at all for the proposed cathedral, the election being made entirely upon the merit of his completed works, or at any rate the drawings of them. We congratulate the committee upon their choice, and the architect upon his election, at which we are not at all surprised when we learn that his Royal Academy drawing of the new church in Red Lion-square was among the drawings of executed works submitted. Mr. Bodley was placed second in the contest.



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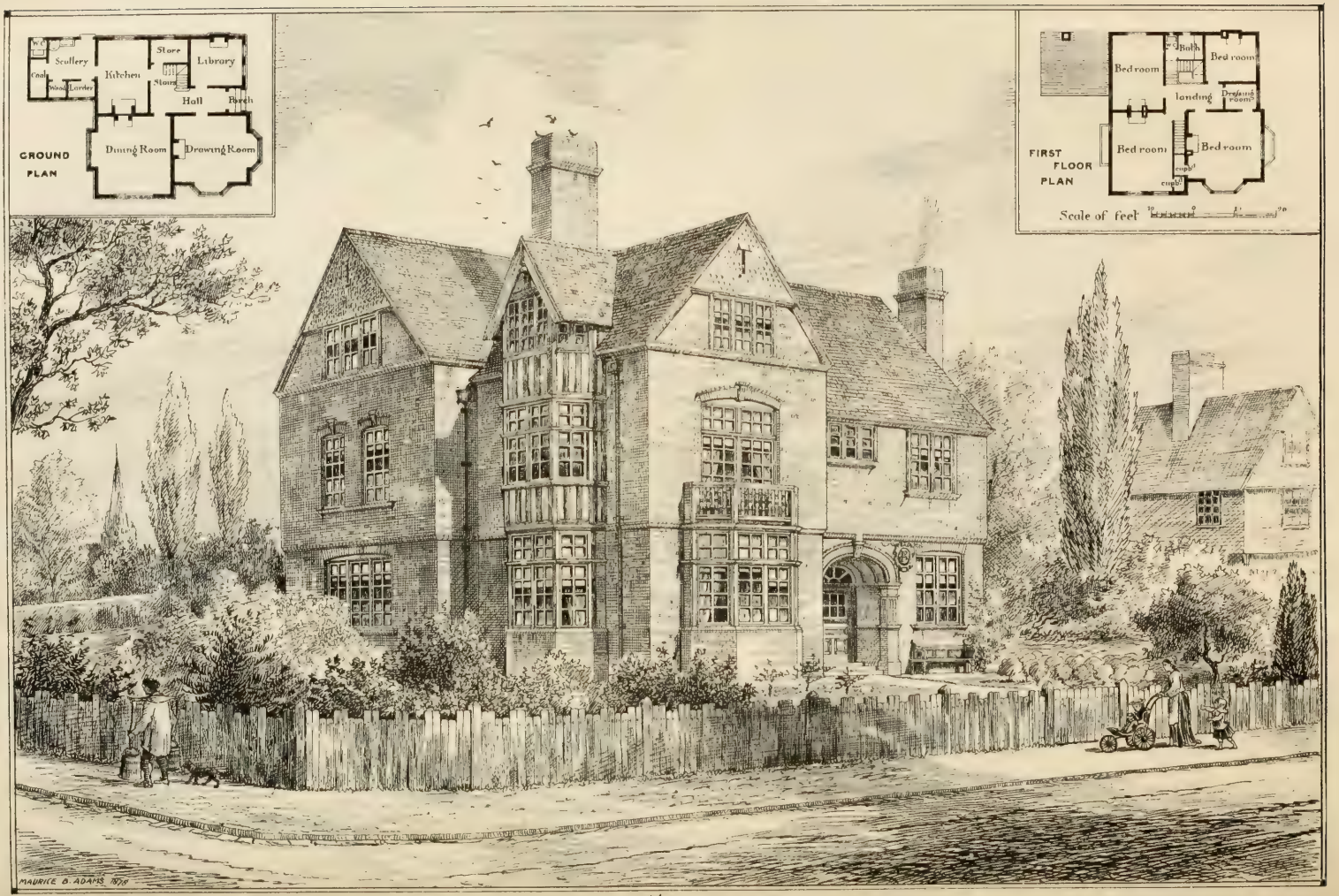

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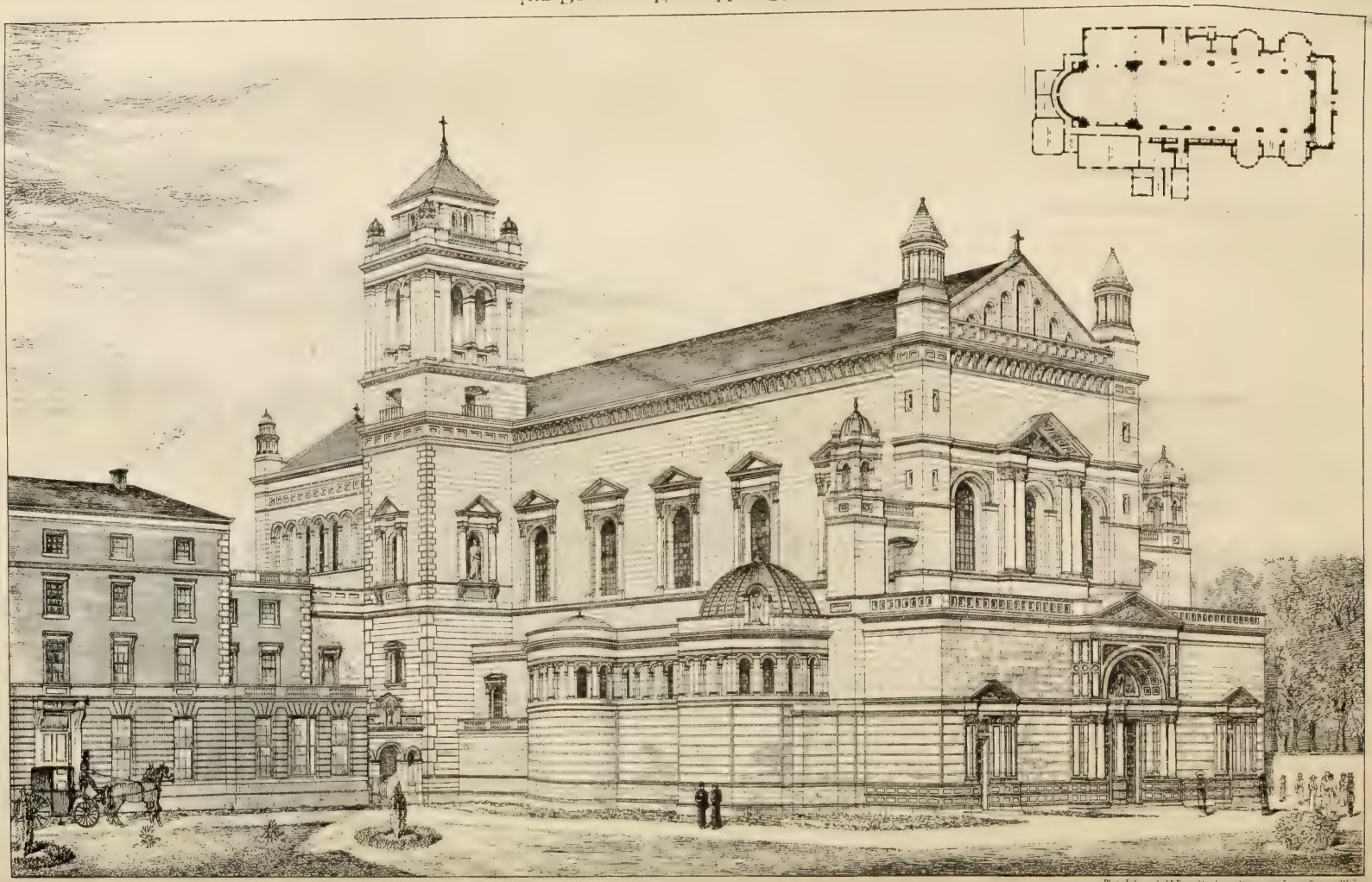

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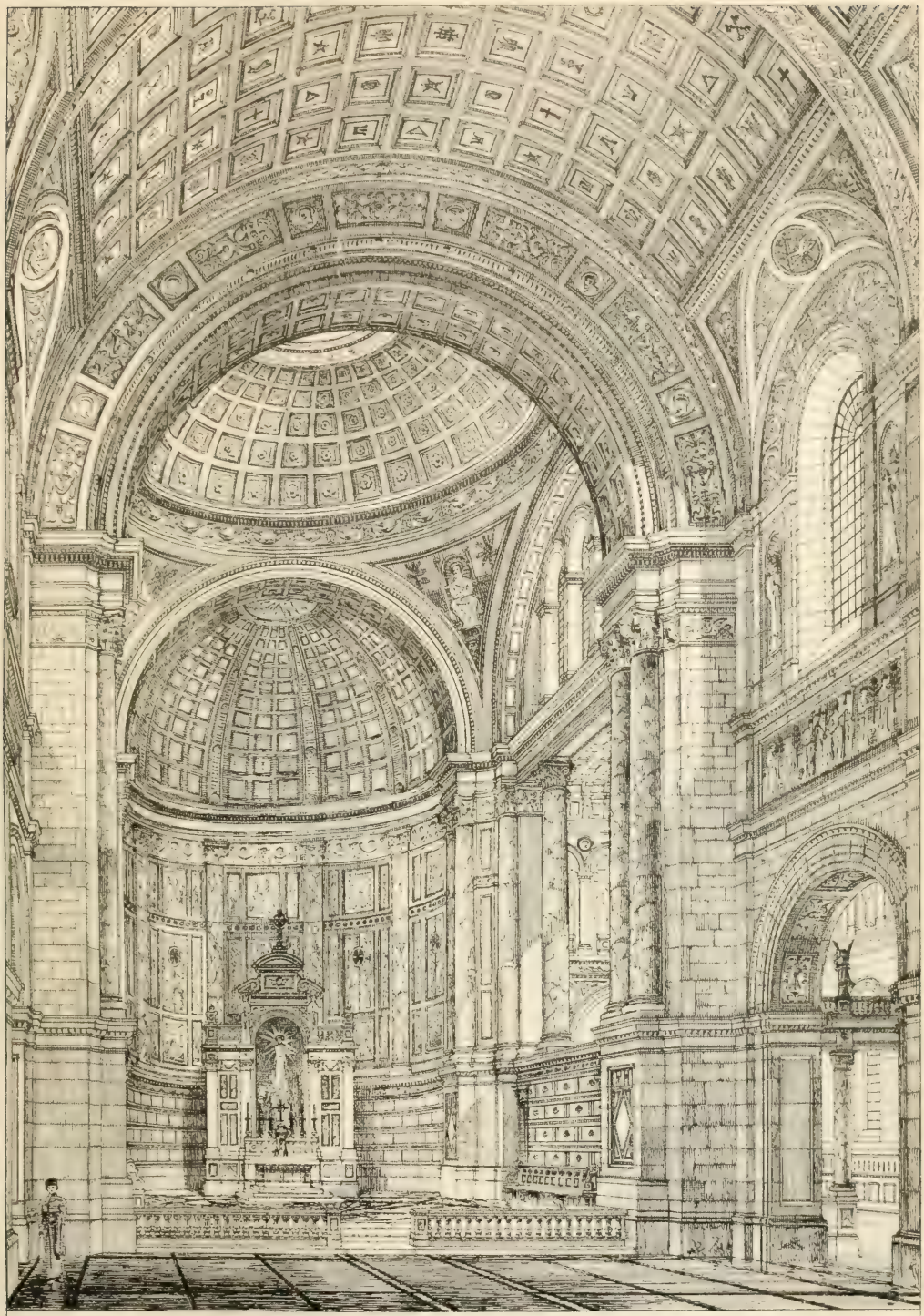
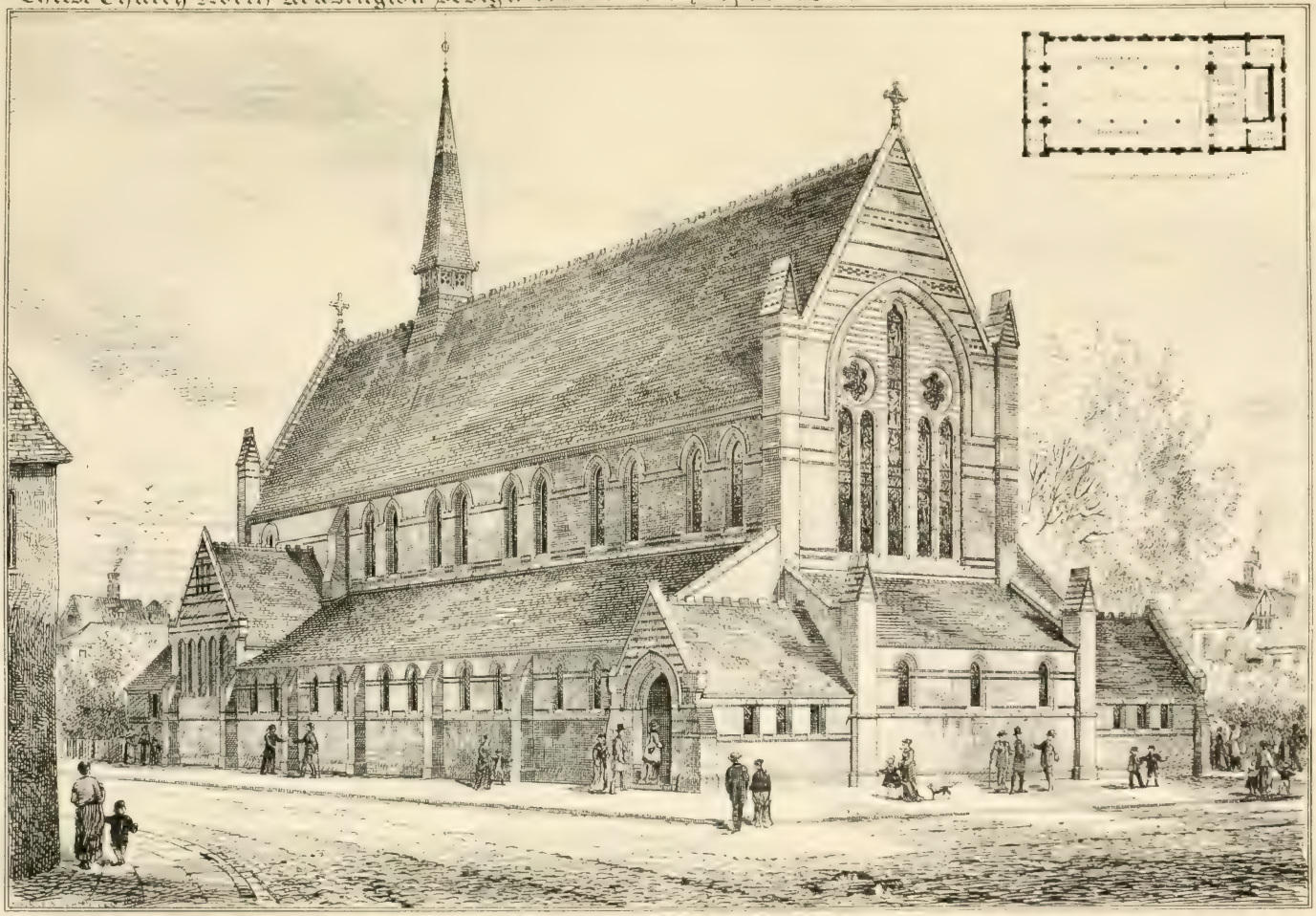
Church of the Oratory Brompton Design by G.E.Grayson ARCHITECT



Church of the Oratory Brompton Design by G.E.Grayson ARCHITECT

Christ Church North Kensington Design selected for Proposed New Church. J. Edward R. Cutts. Architect



* NORTH-WEST * PROSPECT *

May he who made both Jew and Christian

shower down on you his choicest blessings.

Fac. Lithographed & Printed by James Ackroyd 6 Queen Square W.C.

THE CONGRESS OF THE BRITISH ARCHÆOLOGICAL ASSOCIATION AT WISBECH.

[FROM OUR OWN REPORTER.]

FROM the vales and mountains of North Wales to the marshy but highly-cultivated flats of the Fen country, is a leap wider in its span than the absolute distance which separates the east and west coasts of the island. No greater contrast could indeed have been suggested between the districts to be visited in successive congresses than the summer meeting-place of the British Archæological Association of last year and this—the ancient and decayed port of the Wash, and the romantic vale of Llangollen. Wisbech, although not picturesquely situated, is well fitted to form the focus of an archæological excursion, for it is the centre of a locality wealthy in the remains of monastic institutions and abbeys, priories, great parochial churches, and one or two of the protecting castles lying within easily accessible distances from one another, in a district happily described by the president for the year as now forming "the garden of the agricultural provinces of England." The Archæological Association is this year working on ground that has not been so exhaustively examined as many other parts of the kingdom, and the unusually large attendance of members shows that the visit is for several reasons a popular one.

The head-quarters of this, the thirty-fifth annual meeting, are at the Rose and Crown Hotel, Wisbech, the president, for the year being the Earl of Hardwicke. The opening meeting was held at the Council Chamber, on

MONDAY

Afternoon. The Mayor (Mr. Charles Gane) offered the Association a cordial invitation, and remarked that the members would find the "Fenmen's damp domain" had by engineering skill and cultivation been converted into a rich and waving harvest-field. Having read an address of welcome from the Corporation, the Mayor vacated his chair in favour of the President.

Earl HARDWICKE delivered his opening address, in which he sketched the history of the Fens themselves, and of the principal objects to be seen during the annual festival of the Association. Although the district had not been puffed up in archæological annals, he believed researches into its history and of its buildings would repay the most enthusiastic antiquary. The Fen-lands, comprising some 400,000 acres had been reclaimed from a waste and despairing soil into one of the most fertile in England. The industry which had achieved this result stretched back before the period at which history began — when the erratic fishers among the Britons settled upon the small patches of land which rose above the flooded marsh level. The real history of the Fens began with the Romans, who drove four or five raised roads through the borders of the district, including Icknild and Ermine streets and the Via Devana, and the embankment on the east of Wisbech, which they were to see that afternoon. The Roman scheme of drainage was quite equal to their system of roads, for it was a remarkable fact that modern engineers were now compelled to come back to the Roman solution of the problem of removing the water —namely, by accepting the natural rivers as the arterial channels, and cutting only subsidiary drains. The reversal of this plan by mediæval workers was the cause of the many disasters which had befallen the country. Rennie had reverted to the Roman practice, with advantage to the district. The President then summarised the work of drainage since the days of Reedham in 1588-1600, the attempts of Sir John Popham in 1605, those of Sir William Ayloft in 1618, and of the Dutchman, Cornelius Vermueden, in 1631; and then of the more successful undertakings, in which Vermueden was concerned, of Francis, Earl of Bedford, and his son and successor, William, in association. This younger earl in assumption, with four other commissioners of Bedford Level, in 1662 carried out the great wall by which the low-lying lands were rendered fit for agricultural purposes. Another feature of the district was the number of sacred edifices occupying the higher lands, having a beauty and character of their own, and owing their origin in many cases to the retirement to the island spaces of holy men escaping from the world. Foremost amongst these he must mention the forlorn Lady Etheldreda, who fled from a Northumbrian palace to found a monastery on the mound at Ely, where in long subsequent days the present cathedral was built. He might allude to the great ruined abbeys of Crowland, Thaney, and Ramsey—the history of the first-named of which went back as far as the eighth century. Turning to the military history of the district, the President spoke of the vigorous defence of the Isle of Ely by the Saxons, when besieged by William the Conqueror; and to its support of the claim of Stephen against Maud and of the barons in the reign of John, and added that the isle was formerly a watery cave of Adullam. Having referred to several of the chief buildings in north-west Norfolk, Lord Hardwick concluded by a eulogy on the value of archæology as throwing light on the past, and claimed for this study the position not of handmaid to history, but rather that of twin sister. Archæology was not perambulating with hasty steps one part of the country after another, nor was it the hurrying from the nave of this church to the chancel of a second; still less was it to enjoy such hospitality as might be given; no, it was to pick up stray leaves of learning relating to the olden life of our land, and so to fit them together as to make a perfect and coherent whole, illustrative of human thought and progress, and thus it was a study which would never flag nor weary.

Mr. W. MORGAN (hon. treasurer) proposed a vote of thanks to the President for his exhaustive historical and antiquarian résumé, relating to the past of the Marshland, and this was seconded by Mr. G. R. Wright (organising secretary), and agreed to. The members then went to

ST. PETER'S CHURCH,

The principal church in the town. This singular edifice presents a number of suggestive problems to be worked out. It is one of the three double-naved churches in the kingdom, but the peculiarity is that the two naves, of which the southern is much the broader, are embraced under one roof, the western juncture of the gables being connected by a buttress ending in a well corbelled out bell turret. Each nave has an external aisle, and at the east end are two great chancels. Almost detached, at the north-west angle, is a massive pinnacled tower, ornamented with bands of flintwork and carved stone panels, &c. On entering the church the naves are seen to have distinct and very simple oak ceilings, crossed by numerous beams. The three arcades are dissimilar, the northern one being First Transitional, with circular columns and chamfered caps; the central line, light grouped piers and shafts of the pattern usual in the Neve Valley throughout the 14th century; and the arcade between the south nave and its aisle is supported by clustered shafts, with deep bell moulds and caps. At the west end of the north nave, which is the narrower and obviously more ancient of the two, are the piers and responds of an incomplete tower. The two chancels are of nearly similar size, and a skew arch has been thrown across the east end of the north nave to connect the nave and its wider chancel. In the church the Rev. Canon Scott read portions of a paper written by his late brother, Sir G. Gilbert Scott, in reply to the question whether, in restoration of the church then pending, the external roofs should be made separate, and if the internal oak ceilings ought to be removed. In his report Sir Gilbert entered into the evidences furnished of the successive lateral extension of the building till it assumed its present anomalous plan. The naves, he believed, were at one time separately roofed, and the present internal wood ceilings and single over-arching roof were constructed about the time that the old Norman columns were removed from the arcade between the two, and replaced by the present light graceful shafts. He doubted if the engaged western tower in the original nave was ever carried farther than it now appears. The church was not remarkable except for its peculiarities of plan and roofing, and he pointed to the proposal to destroy unique roofing when no constructional necessity demanded it, merely for sake of reproducing the original scheme. He showed how the ceiling could be repaired at much less cost. This advice, said Canon Scott, was followed out in the restoration, during which work the bases of the Norman arcade were found, as Sir Gilbert had suggested, beneath the base of the present central arcade, and concealed by the flooring. The great tower was probably built by John Morton, the clerical engineer of the Fen drains, who lived for a short time at Wisbech Castle, and became successively Bishop of Ely and Archbishop of Canterbury. Upon one of the chief panels were the arms of the sees of Canterbury and Ely. A detailed examination of the building followed, during which satisfaction was expressed that the oak ceilings were repaired instead of being removed. We noted that in the north nave is now a modern Decorated window, having an unmistakably mechanical look about the wing tracery. In Sir Gilbert Scott's report this window is referred to as a "Perpendicular insertion." A warm discussion took place as to the communion table, a ponderous framework of oak, in which is set a narrow slab of Purbeck marble, in which are incised three rude St. Andrew's crosses. Canon Scott suggested that this might be the pre-Reformation altar let into a later table, but the theory was demolished by several members, who showed that the crosses did not look genuine, nor were they the right shape or number, being but 3, in lieu of 5. Mr. Bloxam regarded this as a table of the time of William III., and showed that the one now in the vestry, of much lighter construction, was probably the Caroline table. In the north chancel is a very large brass to a warrior, in chain basinet and breast plate, with long taches, of about the year 1405, to which it is ascribed. Some amusement was caused by the intimation that the reticulations on the body and legs of the figure which had been described to the members by one of their number as an unusual example of a figure entirely clad in chain armour, were caused by the indentations and dust-marks of the cocoa-nut matting by which the brass is usually covered.

LEVERINGTON CHURCH,

About two miles from the town, was also visited. It has a well-proportioned 13th century tower capped by a Decorated spire with good gable lights. The nave is Perpendicular, and attached to it is a beautiful Early Decorated south porch with canopied niches on the heads of every buttress, a crocketed and beniched south front and ornamental cresting of open stonework; it contains a private chamber. The font is an unusually rich Late Decorated structure with sculptured figures on each of the eight sides and on the shafts. The church has been extensively restored by the late rector. The free admixture of Flemish details in tracery, panelling, and parapets bespeaks an affinity with the Norfolk churches, while the spire lights and octagonal angle pinnacles at summit of tower are of the Nene Valley type. On the way back to the town the Roman bank was walked along. This is an embankment still very perfect in places, formed of silt, about 15ft. in average height, with a width at base of 60ft. to 80ft., and at summit of 10ft. to 20ft. A similar bank begins at a distance of two miles, and encloses the river Nene, and a widening area as far as the sea-coast. It was stated that this formed the old estuary of the Ouse, Nene, and other rivers, now partially diverted to Lynn, and that here, where before the members' eyes extended wide fields of sheafed wheat, King John lost his baggage in the disastrous retreat across the Wash. It was further pointed out that all the churches and old windmills are on the outer (landward) sides of the Roman banks, and that their course are marked by tumuli. One of these at Leverington had been opened in anticipation of the Association's visit, but no discoveries were made except of broken pottery, and the ascertaining of the fact that the present level of the base is 4ft., about the original datum.

In the evening a sumptuous luncheon was given to the Association in the public hall by

the Mayor and Corporation. The toast of the evening, "Success to the British Archæological Association," was responded to by Earl Hardwicke and Mr. Morgan, the latter of whom referred to the antiquity of the Corporation, which inherited at its formation in Edward VI.'s reign the privileges and duties which had been exercised throughout the middle ages by the guild of the Holy Trinity.

TUESDAY.

ELY CATHEDRAL.*

A visit to this cathedral was the chief feature of the day's proceedings. Ely was reached by train about 11 a.m., and on arrival at the top of the small hill on which the village city is built the members were received by the Bishop (Dr. Woodford) and several of the local clergy. Passing through the beautiful western Galilee porch, and up the long nave, the members seated themselves under the central lantern, resplendent with diapered colour and gilding on boss, and lierne, and ribs, on which a rich light was thrown at angles by large stained windows, while Mr. Loftus Brock read a paper upon the architectural features of the cathedral. A vast amount of evidence as to the constructional history of the edifice had been handed down to us, almost from the days when it was founded, in the chronicles of Bede, Aser, the monk of Ely, and others, and this documentary evidence he had searched for himself. That the church founded by King Ethelbert was at Clavington, a mile distant, and not on the site of the cathedral, appeared to be established by the fragments of the ancient monastery discovered in the time of William of Ely. Proximity of Clavington may, however, have disposed the forlorn Etheldreda to commence an abbey at Ely. In 870 the Danes attacked the place, burning the monastery and slaying its inmates, and the building remained waste for many years, till the time of Edgar, when the walls were partly repaired by certain monks who lived therein with their families, but the church was not entirely rebuilt till the days of Brihtnoth, at the close of the tenth century. The question arose, Was any part of these pre-Norman buildings to be seen now? Fifty or sixty years ago antiquarians thought Saxon work could be detected in a detached chapel on the south side, but it was now well recognised that this was an infirmary, precisely similar in situation and plan to the parallel example at Westminster Abbey. He (Mr. Brock) had carefully examined the buildings, and could find no work prior in date to the days of Abbot Simeon, who in 1082 laid the foundation of the new church. Only the lower arches of the transepts and the two great circular shafts are standing, one on either side of the third bay of the choir. Simeon's successor, Abbot Richard, carried on the work, and completed the east end. This was then, at that time, formed by a circular apse abutting upon the great shafts of Simeon. The altar stood in the chord of the arc, and therefore in a line with the piers, and behind it was a splendid shrine. In 1109 the abbey was raised to the cathedral of a bishop. There are no records of the date at which the nave was completed, but it is known the western tower was in course of erection by Bishop Eidel in 1174-89, and from the character of the masonry it seems to have been executed between 1104 and 1174. The projecting Galilee porch at the west end was said to be the work of Bishop Eustace in 1189-1215, but the features were many of them of a type of Early English prevalent a quarter of a century later. On the other hand St. Mary's Church in the city, also attributed to the same bishop, exhibited very early work. The problem could only be solved on the supposition that the church was built during the earlier years of Eustace's episcopacy, and the Galilee during his last year. The presbytery, in which was work of very great beauty, was rebuilt by Bishop Northwold, between 1235-51, at a cost, we are told, of £5,350 18s. 8d. This work is of the finest class of Early English, simple in its parts, and wisely ornamented. As in the Galilee every touch of decoration that has been added to the constructional design seems to heighten the effect; the Galilee is not, however, equal to the presbytery in beauty. Prior to this the west tower had been carried up to its present height, with the exception of the octangular lantern, in place of which was a leaden spire, and there was also a great tower at the crossing. Additions were from this period continually being made to the cathedral so as to render it more glorious. In 1321 John of Wisbech commenced the erection of a Lady chapel on the north side of the cathedral—a chapel which, from its wide span, ample light, freedom from pillars, and fine proportions, is one of the most magnificent of its kind. It was designed by Alan de Walsingham, who presently had a still more difficult undertaking to carry out. In 1322 the great Norman tower over the crossing fell, and brought down with it the four arches and piers on which it stood, and the three bays of the original choir. Walsingham replaced it with the present octagon, which was built in six years; and the ruined choir was re-erected ten years later, in 1338, for the bishop, John Hotham. A lantern stage was afterwards raised. The pinnacles of the octagon were never completed, and are at the present time in process of completion from the designs of the late Sir Gilbert Scott. The details of the work in the choir so agree with those in the Lady chapel that, though it is not stated, they must, together with the lantern, have been designed by one man. The new octagon and the west tower were found not to balance each other, and therefore an octagonal stage was added to the latter about 1370, but the weight was too great for the foundations, and in 1406 the piers were strengthened by the building of smaller arches within the old ones. The cathedral still needed height to give balance to the several parts, and he wished the little leaden spire taken down in the last century could be replaced. It was also proposed to add a light open in the octagon lantern, but the idea was never carried out. The latest additions to the cathedral were the chantry chapels of Bishops West and Alcock at the east end of choir, both very late Perpendicular. A passing notice ought to be made of the loss experienced in the death of Sir Gilbert Scott, one of the best memorials of whom would ever be his work in this cathedral. As to the actual site of Etheldreda's church the author threw out the hypothesis that it stood west of the present cathedral, perhaps extending to the site of the Galilee porch. This theory would, he suggested, partially explain the anomalous position of the refectory, chapter-house, and other conventual buildings. The marked features of the cathedral had been copied in the neighbouring churches in a very notable degree. The spire of lead, with octagonal turrets, formerly upon the west tower, had its counterpart at Sutton St. Mary. The north position for Lady chapel was followed at Castle Acre, Thetford, Bromholme, and other parts of Norfolk; and the west tower and central octagonal lantern were imitated at St. Edmundsbury, and Wymondham; Ramsey exhibited a like disposition of towers, which was possibly due to the original suggestion.

The members then made the tour of the cathedral—a progress pleasantly broken midway by luncheon at an hotel. In the choir Mr. Brock drew attention to the series of canopied stalls, of which the upper ones were of Walsingham's time, and the others by Sir Gilbert Scott. The fronts of all contain panels, containing some well-executed modern wood-carving, the work of a Belgian. The stalls were originally placed under the octagon, but in the last century the architect, Essex, removed them, needlessly disturbing the monuments in the process. Most of these have been recently replaced. Mr. M. H. Bloxam described the tombs and effigies of bishops, abbots, and others, the most interesting being the Norman slab of marble now laid in the south aisle, showing an angel bearing a soul to Heaven. The angel's wings and representations of mouldings fill up the whole of the back of the monument. The chantry chapels at the east end of choir are very interesting dated examples of the transition from florid Tudor to Renaissance. That of Bishop West (dated 1500) on the north side has the ceiling richly groined and the walls almost hidden by exuberant tabernacle work. The chantry has been restored, and now blazed with colour in roof, windows, and pavement. The south chapel, Alcock's, is in better taste, though 33 years later, and forms one of the most attractive examples of "impure Tudor." The ceiling is coffered and divided into lozenge panels; these are filled up with cherubim, arabesques, torches, and similar Classic details. The walls are panelled, many of the mouldings being distinctively English Perpendicular. Traces of the original colour can be detected. The reredos, which was designed by Sir Gilbert Scott, met with general approbation as appropriate in style and character to its position. It is of alabaster, with a free use of crystals, gilding, and statuary, and is treated in the Perpendicular style. The same praise cannot be bestowed upon the modern chancel aisle screens, the ironwork on which is worked into too realistic a representation of natural leaves and fruit, and is withal coloured to increase the supposed resemblance. A bold conventional treatment is the only one suited to the material and the use to which it is here put. Part of the south transept is walled off as a library, which contains about 4,500 volumes, chiefly theological of the last century. The nave ceiling has been adorned with paintings in compartments, by the late Mr. Le Strange and Mr. Gambier Parry, emblematic of Our Lord's life, and is very effective in appearance, although the tone of colour is perhaps a little too light. The lantern ribs and vaulting webs are lavishly treated, and although here the colours are somewhat too bright the general effect of the scheme is very rich and impressive. The Lady chapel, used since the Reformation as a parochial church, received the attention its elegance and lightness of character merit. The walls are panelled and arcaded throughout, a series of rich ogee and crocketed and cupped canopies overhanging the continuous stone seat. The roof is of lierne construction, and adds greatly to the beauty of the handsome chapel. The interior is as yet unrestored, except that thirteen years since open seats were substituted for high pews. Each of the hundreds of statuettes which crowd the canopied work has, with one exception, lost its head; the cuspings and finals are broken away, the vault and walls show traces of faint colouring, and the windows are nearly all filled with modern plain white glass. Mr. Brock and Mr. Bloxam pointed out the architectural features of this superb room, and Mr. Blashill remarked on the practice during the thirteenth century of erecting large chapels to the Virgin Mary, and rendering them accessible to the general congregation. Archdeacon Emery drew aside the modern frontal cloth (worked by the sisters of Clewer), and asked advice as to the desirability or otherwise of restoring the rich arcade at the east end; the general advice was against the proposal to repair and retouch the colouring on this work. Some discussion arose as to the date of this work, the weight of opinion being that it was carried out contemporaneously with the larger and less ornate arcading in the rest of the chapel. After luncheon the exterior of the cathedral was glanced at. The south-west transept, with its twin octagonal turrets, was was seen to be leaning seriously outwards, and the windows and voussoirs are splitting, threatening a similar disaster to that which had long since befallen the corresponding wing on the north. The great tower is trussed together with an elaborate system of ironwork, and yet needs careful watching. Progress is being made with the completion of the masonry on the octagon. Crocketed Perpendicular buttresses have been added to all but three buttress-heads, and the intending parapet is being finished with a low screen of pierced and flowing pattern. Returning to the nave Archdeacon Emery acted as guide, and showed coloured sketches depicting an imaginary restoration of the Norman west front and of the Lady chapel scheme of colouring, prepared from the designs of Mr. Edmund Sharpe, M.A., and said that a new roof painting, by Mr. Gambier Parry, would be unveiled in a few weeks, the subjects the life of John the Baptist, the chapel being dedicated to that saint. Outside the south of nave remains of the north cloisters' walk, Transitional and Decorated work was seen, and also the priests' door, having an elaborate tympanum, and representing spirits weighed in the balance by our Lord, and enriched mouldings. The doorway has been claimed as Saxon, but was pronounced by Mr. Brock and others as of

* The west front of this cathedral was illustrated in the Building News, Nov. 15. 1867; the lantern on July 10, 1863; and a view of the nave interior appeared a few years since.

about 1170, set into a wall 30 years anterior in date. At the eastern end of nave are still more interesting monks' doorways, both external, the one opening into nave, the other into the transept. Both are fragmentary, and are adorned with the [illegible] ornament. In each case there is above [illegible] one a female head projecting above general surface. The east door was walled up by Walsingham in his efforts to strengthen the central octagon at its weakest point, a buttress of 14th century character being built through the arch. This eastern doorway is of the earliest type of Norman, being treated with the star pattern, and was only discovered five or six years ago during the replastering of the wall. From hence the party proceeded to view the conventual buildings, all on south side of cathedral, and the uncertainty of the identification of these gave rise to frequent discussions. The infirmary is, as at Peterborough (where the remains occupy a precisely similar position to these), partly built up into canonical residences; the arcades have columns circular and octagonal, set on edge in alternation—an arrangement Mr. Brock showed also followed in the bases of the west transept. The columns and arcades are about the date 1160, but have been shamefully mauled by former canons in residence. The 14th century guest-hall now forms the basement of the grammar school, but the location was disputed by Mr. Reynolds and others, who also doubted the received plotting of the former chapter-house in the dean's garden, on south of cathedral nave. Mr. Emery said the Dean and Chapter wished advice on this point, as they were desirous of building a chapter-house. Visits to Prior Crawden's chapel, now that of the grammar school, a beautiful specimen of Walsingham's work, not at the moment in the cleanliest or best repaired condition; to the ancient porter's lodge, with its wide 4-centred gateway and the chamber above, alternately used as a looze and prison, and now as the school day-rooms, concluded an instructive day at Ely. It was gratifying to hear from the archdeacon that the grammar school governors are about to erect new and suitable premises opposite the buildings they now occupy; schoolboys are not the most discreet custodians of valuable specimens of monastic buildings.

After the return to Wisbech the excellent permanent town museum in the Crescent was examined. It contains a good collection of early pottery and flint weapons dug up in the neighbourhood, besides geological and ornithological collections, seals, and coins. Among the special exhibits were the objects recently found at Leverington and Walsoken. The Castle site and the vaults there and elsewhere in the town were also seen.

In the evening a meeting was held in the Council Chamber; the Mayor of Wisbech in the chair.

Mr. T. Morgan read a paper upon "The Roman Roads in Cambridgeshire"—a subject illustrated by the exhibition of a map, on which was delineated the Roman military roads through England. mentioned in the "Itinerary" of Antoninus. The stations can be traced by the names still clinging to the sites, and by the numerous remains found at intervals all along the roads. The old sea-walls, with their system of dykes and drains, were referred to, and also the forts by which these drainage works were defended. The various roads between East Anglia and the North of England and those causeways across the Fens were also alluded to. A warm discussion followed, in which the correctness of the popular identification of the stations was impugned and well defended.

Mr. Jonathan Peckover followed with a paper upon "The Tumuli of the Fen District," in which he described the singular mounds upon the higher parts of the district. These had been the subject of wonder for the past thousands years—since the days of Guthlac—but had only recently been examined. In those just opened at Leverington nothing of great interest has been discovered, the finds consisting of broken pottery and bones. The tumuli could be divided into three classes, the burial mounds often arranged in pairs—those on which crosses were subsequently erected, and those on the Roman roads.

"Wisbech Castle" was the subject of a paper read by Mr. R. B. Dambarn. The title had been applied to three or four entirely distinct buildings—Norman, Tudor, and Renaissance. The Norman structure was probably preceded by an entrenched camp of turf and stones, but the absence of notice of the castle in Domesday Book agreed with the tradition that the regular fortress was erected in the last year of William I. The castle was placed close to the confluence of the Ouse and Nene, and their ancient estuary; in a good position strategically, but dangerously near the sea, and by which it was partly destroyed in 1236. It was soon repaired in ragstone, when it was entirely moated with a drawbridge. An enlarged copy of the seal of one of the governors, Sir John de Colville, in 1410, was exhibited and shows an ordinary Plantaganet fortress, with barbican closed by portcullis, with flanking loop-holed towers, and tower behind, and it was suggested this afforded a general idea of the castle. The chief interest in this building is John's visit the day before his attempt to ford the Wash, just below the town, Oct. 12th, 1216. The castle passed into the hands of the Bishops of Ely in the 14th century, when it was used as a palace and prison. It was entirely rebuilt by Bishop Morton in Edward IV.'s reign. A plan of the castle, still showing the surrounding moat, was exhibited. Of the earlier buildings only a few fragments of masonry have been discovered. Outside the moat three dwellings in York-street mark the site of the ancient "Mote Hall." The castle was again destroyed in the 17th century by Cromwell, and on the site a house was built by Lord Secretary Thurlow, from a design by Inigo Jones, repeated at Longthorpe Hall, Peterborough, at Coleshill House, Berks, and many other places. The views exhibited showed a solid quadrangular two-storied structure, with heavy projecting porch and mullioned windows, besides a turret in centre of the building. These premises were pulled down 80 years since by a local builder, Mr. Medworth, who erected on the site the Crescent, leaving only the piers of the old gateways. The vaults were extensive, and there seems some truth in the tradition that they communicated with other and very extensive vaults on the river side—perhaps as culverts. Mr. Dambarn's conclusions on minor historical events were sharply sifted in a discussion which ensued, it being suggested that the representations of buildings on seals were strictly conventional, and not worthy of notice, while on the other hand instances of the reliability of some specimens were adduced.

WEDNESDAY.

This was a very long day of visits to the Marshland churches, the small market town of Swaffham, and the castle and priory, closing with a meeting in the evening, the programme extending over a period of 15 hours. Road and rail were nearly used up during the excursion. The Marshland is a perfectly flat tract of fertile land, isolated by the Ouse and Nene rivers and the Wash estuary; it is sprinkled over with handsome churches, containing much work of the 14th and 15th centuries, well wrought out, but Flemish in tone. These churches are a world too large for the present population, and, although the construction is substantial, are much in need of repair. The carriages for some time after leaving Wisbech passed along the ancient raised causeway defining the former boundary of the Wash.

WALSOKEN CHURCH

Was the first halting place. It is a good specimen of ecclesiastical architecture of Norfolk. The long line of embattled and pinnacled clerestory over the nave and the lead-covered chantries and chancel harmonise with the tower, which has upon it on the lower stages arcading of Early English character, and above this a later story, finished with octagonal turrets and parapets, and inclosing the base of a rather heavy stone spire. Within, the rich Norman arcade rests upon columns alternately round and octangular, and above is a very fine Perpendicular roof. Its hammer-beam principals are supported by canopied statues, with figures of angels at the springings. Over the tower-arch is a large rudely-carved wooden figure of a crowned king, with orb in hand, and on either side old paintings of "The Judgment of Solomon" and "The Nativity." In the church, Mr. Brock delivered an address, pointing out the influence of Ely upon the tower and nave arcades. The roof was, he said, of extreme beauty, but much needed attention. It was substituted for a high-pitched roof entirely in the 15th century. The cutting into the Norman piers of chancel-arch for the rood stairs was quite apparent, and also those in the faces in which the loft itself was fitted. In the chancel were a series of nine retrimmed stalls, probably used by the guild, of which the seal, dated 1450, still exists. A fragment of carving built up into the north aisle wall was examined *in situ*, and was pronounced to contain an enshrined heart, and Mr. Bloxam suggested that if removed, relics might be found behind. It was found that the old rood loft—a work of great beauty—had been bodily removed, and now forms the entrance to the south chantry.

WEST WALTON CHURCH.

This noble edifice, chiefly built in the middle and purest period of English architecture, and completed in the Perpendicular style, is in a dilapidated condition, and needs speedy repair, even more than that seen just previously. The discoloured whitewash, the plaster flaking from the walls, the painted wooden shafts by which defective Purbeck shafts have been replaced, and from the bare expanse of uneven brick paving to the clumsy repairs to the hammer-beam roof — all spoke eloquently of the results of the anti-restoration principle in practice. At the entrance to the churchyard is the detached tower*, concerning which Mr. A. Peckover humorously related the Marshland legend that it was removed from the west end by four evil spirits who were, however, unable to get it over the limits of consecrated ground. The insecurity of the foundations, as evidenced by the huge buttresses planting the west end, suggests a commonplace explanation of the unusual position of this feature. The west entrance is divided by a Purbeck column as at the slightly earlier Cathedral of Ely. The front has a lofty cover, opening like a triptych, covered in ornament of a debased Gothic character. In the north aisle—a bad rebuilding of the 18th century—are the fragments of the effigy of an ecclesiastic in the eucharistic robes of about 1240. These pieces are laid with the head turned the wrong way (westwards) on an altar slab. Mr. Brock pointed out that no efforts were made by those who put up the present hammer-beam roof to fit it to the walls. Some of the beams fall partly above window spaces, others do not even touch the walls. This roof is falling into a condition that will give great trouble when the time comes for repair, for the arcades are forced out of the level, especially on the north side.

WALPOLE ST. PETER,

One of the latest Gothic churches in Norfolk, detained the members some time. It has much panelled sculpture upon the tower and clerestory, and the south porch is of the county type of Perpendicular. It has niches in parapets, and a parvise chamber, beneath which is a groined roof, rich in carved bosses. The two western bays of nave are shut off to serve as a vestibule by a large and heavy screen. This obstruction was put up in 1828, and is solid below, with open balustrades above, after the fashion of the four-post bedstead of our grandfathers. The font has a cover still larger than that at West Walton; it is dated 1627, and is of four stages, pierced with early Jacobean carving. The church contains much elaborate carving in canopied niches and stalls of the fourteenth century. Between each of the chancel windows is a recess for a saint. The lower part of the rood screen still remains, and upon it are painted quaint representations of St. James of Compostella and other saints. The east end of chancel has considerable dignity imparted to it by being raised by half-a-dozen steps. This appears to have been done to avoid deviating the public footpath, which still runs in a groined passage beneath. Mr. Brock referred to the fact that the three churches just visited formed a consecutive series—Walsoken

* Illustrated in the Building News, Dec. 31, 1875, Vol. XXIX., p. 748.

chiefly Transitional Norman, Walton Late Decorated, and Walpole partly of the sixteenth century; and added that the prefix "Wal" referred to the great Dyke, and was always applied by the Saxons to a Roman camp. The north door was very beautiful. Mr. Peckover directed attention to a small stone figure, said to be Roman, found near the sea-bank, and now used like a caryatide at the south-east corner; identified with Huckathrift, a giant, to whom many wonders are locally assigned. It was identified as mediæval, and not Roman.

TERRINGTON ST. CLEMENT.

The church is one of the largest in Marshland, and has short transepts, lantern at crossing, chancel, and aisled naves. The chancel is at present under restoration from the plans of Mr. A. Blomfield, Mr. Thompson, of Peterborough, the contractor; and in the course of the work some interesting fragments, including a piece of early interlaced moulding, have been discovered. The church is chiefly of the Perpendicular period, and its harmonious proportions and good workmanship deserved more attention than could be bestowed on them.

From King's Lynn the members went by rail past the mediæval towers of Middleton to the low chalk hill on which is built the market town of

SWAFFHAM.

After luncheon at the Swaffham Crown, a hasty visit was paid to the fine parish church, rebuilt about the close of the 15th century. The arcades, on well-clustered columns, separate from the lofty nave two spacious aisles, and abundant light is poured down from large aisle windows and clerestories. The chancel and transepts are short and shallow. The nave roof is one of unusual grandeur even in Norfolk—a high-pitched hammer-beam roof—and has tiers of angels with widespread wings supporting the principals, and on the corbel table are carved other angels. The chief external feature is a high square tower, surmounted by a modern lantern spire.

CASTLE ACRE CASTLE AND PRIORY.

Carriages were then taken to the village of Castle Acre. The castle itself was the first point of attraction. It consists of a series of massive walls of rubble masonry, faced in places with dressed Barnack stone. This stonework is disposed in irregular weed-o'ergrown circles upon and around a number of earthworks. The principal of this is a conical mound of great height, and the shell of a round keep crosses this, so as to inclose the highest point of the hillock. The architectural features have been in great part quarried out by the villagers. The members seated themselves on the inner side of the castle walls, on the great mound, while Mr. Brock read a paper in which he not only traced the origin of the castle in the days of William the Conqueror, but argued the larger question as to how far the Saxons used stone for defensive purposes. The castle, he said, was built by William de Warrenne. The whole village of Castle Acre was inclosed by a quadrangular space; but it was known to be a Roman camp from its position on the Peddar's Way, running north to the coast at Brancaster, and from the coins and pottery found herein by Mr. Harrop, the county historian. Within this camp again was a smaller inclosure containing mounds, and the circular and ballium shell walls of a castle. This was doubtless that built by Warrenne, although the plan deviated from the usual one. The mounds were much earlier, perhaps British, and he believed the Saxons fortified the great one with a palisade of wood and stonework, and a ditch. From analogy and comparison with the very numerous mounds in other parts of the country, Mr. Brock argued that these high spots were seized upon by the Saxons, and rendered strongholds, and Lewes was specially cited, from its connection with Castle Acre, through the common owner, Earl Warrenne. It was shown that these mounds are very abundant, and that where the Normans acquired the country they also secured these, and erected on them castles, planning the outline of the keep so as to fit the mound. The square-towered Norman fortresses, such as London, Dover, Scarborough, and others were built on new sites, no mound or natural advantage existing.

After seeing the Perpendicular Gatehouse spanning the village street, the members passed into the Priory grounds through a second gate, also of flint, with brick dressings, and on the outer side shields of arms still almost as perfect as when cut. The priory is now almost a wreck, the west front, one of the most beautiful specimens in England of Late Norman work, being the chief feature remaining. This is lofty, and flanked by two fragments of towers, in each of which are, on the upper stage, two lancet windows. These are evidently original, and afford very early examples of the introduction of this form of arch. The great portal is inclosed by many different bands of mouldings, all very sharp in outline, and the rest of the front is covered with interwoven blind arcading of singular purity. The centre of the front has been taken down to allow of the insertion of a Perpendicular window, which in its turn has also disappeared, except fragments of the cusping and mullions in the head. Opposite this beautiful ruin Mr. Brock read another exhaustive paper, in which he traced the history of this priory of the order of Cluny from its foundation by William de Warrenne, and building in 1134-48, to the time of the Dissolution, when the number of brethren had dwindled from 36 to 10. Mr. Brock described the building, pointed out the massive construction of the walling of concrete and small stones fused with the beautiful Barnack stone. Nave, aisles, and transepts could be clearly seen, and the great circular pillar, with a twisted band and chamfered cap, might be regarded as a general type of those of the arcade. The east end could not be made out on the ground, but he conjectured that it was not square, as generally supposed, but that it terminated in a chevret of chapels, like the mother abbey at Cluny, and that at Lewes and elsewhere. If the noble owner of the site (Earl Leicester) were to excavate the area now covered with earth and vegetation, to the depth of from 2ft. to 6ft., he believed valuable discoveries as to the arrangement of these Cluniac houses would be made. The original pavement had been come upon several times in the course of excavations, and he earnestly hoped Lord Leicester would undertake the work. At the close of the address Messrs. G. R. Wright and W. Morgan proposed a vote of thanks to Mr. Brock, and also a resolution requesting Lord Leicester, in the name of the association, to carry out a similar good work to that undertaken by the Earl of Dungannon and Mr. C. W. Wynn, at Cymmer and Valle Crucis Abbeys. Mr. Bloxam afterwards conducted the members over the conventual buildings on the south side of the abbey. In the evening, at the Council Chamber, Wisbech, papers were read on "The Drainage of the Fen Lands in Mediæval Times," by Mr. J. W. Grover, F.S.A., C.E.; and "The Life of St. Guthlac from a MS. in the British Museum," by Mr. W. de Gray Birch, F.R.S.L.

THURSDAY.

Yesterday morning the members proceeded by rail to King's Lynn, where they were received at the Guildhall by the Mayor and Corporation. Having inspected the silver regalia, the long series of charters, and other MSS. belonging to this ancient borough and port, a perambulation of the town was made—the great churches of St. Margaret and St. Nicholas, the remains of the octagonal steeple of Grey Friars priory, the old town walls and south gate, and other mediæval buildings being viewed. After luncheon the party were conveyed in carriages to the Norman stronghold of Castle Rising, and after a very brief stay there to Sandringham Church and the House, the seat of the Prince of Wales, returning to Wisbech in time for an evening meeting. We must reserve our detailed description of this day's proceedings until next week.

The programme for to-day (Friday) includes visits to Thorney Abbey, Crowland Abbey and triangular bridge, and Spalding Church and Priory. That for Saturday, a visit to the great Norman church of Castor by Peterborough, and to the town of Stamford, returning to Wisbech in time for a closing meeting at the Council Chamber. Monday and Tuesday will be spent at Cambridge in visits to the churches, colleges, and old houses of the University town. We shall continue our special report next week.

STREET LIGHTING BY ELECTRICITY.

THE Vestry of Chelsea having sent their surveyor (Mr. G. H. Stayton) to Paris to inspect the system now being tried there for employing the electric light in lieu of gas for street lighting, he reports that the distance between the lamps in Chelsea being much greater than in Paris, and there being only one lamp upon each column, greatly increases the comparative cost of the systems. The present cost of a gas lamp in Chelsea, burning 3,850 hours per annum, is £3 6s. 7d.; therefore the expense of the 40 in Sloane-street, is 8¼d. per hour. To adopt the electric light for Sloane-street would necessitate two electric stations, and 32 electric lights, the total expense of which would be £3,200, and the hourly cost would be 16s. for 3,250 hours per annum. To light the Chelsea Embankment, which is about 1,530 yards long, and has 109 gas-lamps (including those on the river wall belonging to the Metropolitan Board of Works), would require a first outlay of £4,800, for forty-eight lights of 3,850 hours per annum, with an hourly cost of £1 4s. The present cost of the gas-lamps is 2s. 1½d. per hour for 3,850 hours per annum. Mr. Stayton has arrived at the following conclusions:—"That the present arrangements for electric lighting are unsuitable for long distances (in this I am supported by the city engineer of Paris), especially in London, where the lamps are so much farther apart than in Paris. The close proximity of the electric stations is a great drawback to the system, and their establishment in business streets would be a matter of considerable difficulty. These are the disadvantages of the system. The following are the advantages:—About one and a half hour's daily consumption is saved in consequence of instantaneous lighting and extinguishing, the light is vastly superior to gas, and is not injurious; there is an absence of noxious smells both in the production and combustion; the heat in a room, so often unbearable in the case of gas, is scarcely felt, the most delicate colours are preserved, air is not consumed, as in the case of gas; there is no chance whatever of explosion, and, although the light is so powerful in the streets, no accidents to horses have occurred. After a careful consideration of the whole question, I am of opinion that at present the electric light is not suitable for street lighting in the metropolis; that it is suitable and can be used with splendid effect in large squares and places, such as Trafalgar-square and Parliament-square; but, although in each of these places at the present time the lamps are numerous, the cost would be greater than gas. I am also of opinion that so soon as the modifications alluded to can be effected (particularly as to the electric current being carried to a much greater distance, thereby reducing the cost), the electric light will very soon supersede gas to a considerable extent, the attendant advantages being so great."

CHIPS.

A memorial window recently placed in a Tyneside church has been the cause of a little amusement to the congregation. Owing to a technical difficulty connected with the interior of the building, the inscription is made to read right across the window, somewhat as follows:—"And seeing the multitudes, He went up into a mountain, in memory of ——, who died August 20, 1874, and when he was set His disciples came unto him."

During the holding of the ensuing Church Congress in Sheffield an exhibition of ecclesiastical art will be held in the Skating Rink, Glossop-road, which the committee have let to Mr. John Bray, who was the manager of a similar exhibition at Croydon last year. There will also be a loan department, and Mr. Charles Hadfield, architect; Mr. Lougden, Phœnix Foundry, Scotland-street; Mr. Joseph Binney, Bank-street; and Mr. J. Hardy, 9, Norfolk-row, will be glad to receive works of ecclesiastical art for this department.

Wesley Chapel, Whitby, has undergone a complete restoration. Wesley chapel was opened in 1788 by John Wesley, only three years before his death. Mr. W. Falkinbridge is the architect, and Messrs. Winterburn and Sons are the contractors.

The Boys' Home, Ipswich, was opened on Saturday last. The building, which will accommodate 200 children, and has been added to at a cost of £5,000, is of red brick and of plain design. The architect was Mr. Brightwen Binyon, and the builder, Mr. Robert Girling, of Ipswich.

More than Fifty Thousand Replies and Letters on subjects of Universal Interest have appeared during the last ten years in the ENGLISH MECHANIC AND WORLD OF SCIENCE, most of them from the pens of the leading Scientific and Technical Authorities of the day. Thousands of original articles and scientific papers, and countless receipts and wrinkles embracing almost every subject on which it is possible to desire information have also appeared during the same period. The earliest and most accurate information respecting all new scientific discoveries and mechanical inventions is to be found in its pages, and its large circulation renders it the best medium for all advertisers who wish their announcements to be brought under the notice of manufacturers, mechanics, scientific workers, and amateurs. Price Twopence, of all booksellers and newsvendors. Post-free 2½d. Office: 31, Tavistock-street, Covent-garden, W.C.

TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.]

All letters should be addressed to the EDITOR, 31, TAVISTOCK-STREET, COVENT-GARDEN, W.C.

TO OUR READERS.—We shall feel obliged to any of our readers who will favour us with brief notes of works contemplated or in progress in the provinces.

Cheques and Post-office Orders to be made payable to J. PASSMORE EDWARDS.

ADVERTISEMENT CHARGES.

The charge for advertisements is 6d. per line of eight words (the first line counting as two). No advertisement inserted for less than half-a-crown. Special terms for series of more than six insertions can be ascertained on application to the Publisher.

Front Page Advertisements and Paragraph Advertisements 1s. per line. No front page or paragraph Advertisement inserted for less than 5s.

Advertisements for the current week must reach the office not later than 5 p.m. on Thursday.

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Cases for binding the half-yearly volumes, 2s. each.

RECEIVED.—W. M. B.—H. and B.—R. M. and Co.—S. L. B.—T. D.—S. and S.—S. and Co.—B. and T.—L. and N.—G. W. R. Co.—T. S. C.—C. C. H.—R. D. and Co.

SUBSCRIBER. (Try some of the firms whose advts. appear in this journal.)—W. P. G. AND N. TAWTONIAN. (Join the Architectural Association and attend its classes.)—G. BRIDGE. (You will find a list in the Directory; there are more than one in your district.) — SURVEYOR. (Write Lockwood and Co., Stationers' Hall-court, E.C.)

DRAWINGS RECEIVED.—W. R. Best.—H. F. B. and E. I. B.—J. F. S.—H. P. and G. B. B.—J. W. S.—A. B. P.—John Carver.—W. Wood Bethell.

OUR COMMONPLACE COLUMN.—Received: J. A. (Please write your notes in future on one side of the paper only.)

Correspondence.

ON SKETCHING.

To the Editor of the BUILDING NEWS.

SIR,—We believe we shall only be representing the sentiments of a very large number of architectural students in expressing the pleasure with which we noticed Mr. W. R. Lethaby's suggestion in your issue of the 9th inst. We have repeatedly experienced similar annoyance and disappointment in our sketching tours, and we believe that were students furnished with some such credentials from the Institute or the Architectural Association they would not only obviate unnecessary expenditure, but also the great waste of time in obtaining orders from the responsible quarters. May we also indulge in the hope that by some international agreement between the principal art institutes such facilities may be extended to the Continent?—We are, &c.,

W. H. SETH SMITH.
J. C. P. HIGGS.

Ramsgate, Aug. 19, 1878.

ST. HELEN'S, BISHOPSGATE.

SIR,—Some regret has been expressed on behalf of the Society for the Protection of Ancient Buildings at the removal of the canopy over the west door of the nave of this church. On examination it was found to be so decayed that there was no hope of its retention, and, as the original stonework remained under the wood casing, we felt that the proper course was to repair the stone. In all works of restoration great discrimination is required, to preserve only that which is worth preserving; to the best of our judgment we have endeavoured to follow this rule in all that has been done to the inside and out.

We think there cannot be two opinions as to the beauty of the west door of the nuns' choir, which is doomed again to be immured in brickwork if funds are not forthcoming for its reinstatement.—We are, &c.,

WADMORE AND BAKER.

BODMIN TOWN HALL COMPETITION.

SIR,—As a lover of truth and justice, I send you the advertisement which appeared in the *Western Daily News*, and shall feel obliged if you will insert the same and this letter in your next issue. There is not the slightest doubt but that the advertisement was inserted to mislead intending competitors, for if they had not contemplated changing the fire-engine station from Fore-street, they would not have mentioned the matter in their advertisement to architects. I am sorry to say it is another of the great injustices perpetrated on our profession by Local Boards and others, as it seems quite clear the thing was cut and dried before it appeared to the general public, also as to the amount to be expended. The conditions and advertisement state that the whole of the buildings were not to exceed £2,500, and they on the face of this accept a design for £3,000. Do you call this justice to the rest of the competitors and myself? When I competed, at much trouble and expense, I thought I was dealing with a board of honourable gentlemen, who would treat the matter with fair and proper consideration.—I am, &c.,

EDWARD CLARK, Architect.

61, Adam-street, Adelphi, London, W.C.

TO ARCHITECTS.—Municipal Buildings, Bodmin.—The Town Council of Bodmin invite Plans and Specifications with estimates of the cost of making Additions to the existing Corn Market and Adjoining Premises on Mount Folly, and providing Municipal Offices suitable to the requirements of the town of Bodmin, comprising a Public Hall capable of containing 1,200 persons (with fire engine-rooms, &c., under), a Council Chamber, Committee-rooms, Town Clerk's Offices, and lavatories, &c., &c. The entire cost of the buildings and additions, including excavations and approaches, not to exceed £2,500. A premium of £25 will be paid to the architect whose plan is accepted, such sum to merge in the amount of his remuneration in respect of the work if carried out under his supervision. For further particulars application must be made to the undersigned, to whom the plans, &c., should be sent on or before the 12th March, 1878, sealed up and marked "Municipal Buildings," and bearing some motto or device, and accompanied by a sealed letter, stating the name and address of the person tendering.—PRESTON WALLIS, Town Clerk. Dated Town Clerk's Offices, Bodmin, 29th January, 1878.

SIR,—Both "An Outsider" and "Another Competitor" seem entirely to ignore the first advertisement, which distinctly states that an engine-room was to be provided under hall, and the lithographed particulars were issued as addenda to the first advertisement.

The justices' retiring-room in accepted plan is not one such as is asked for by conditions. I thank "An Outsider" for his advice; but would it not be better, before rushing into print about what he owns does not concern him, for him to stick to his dictionary, as I have yet to learn that my letter of protest is in any way entering into a controversy. No one has done more than you to try and put competitions on a better footing. But after the letter of "Another Competitor," approving as he does of the successful competitor's conduct, I am afraid it is hopeless.—I am, &c., A COMPETITOR.

[This controversy ends here.—ED.]

Mr. G. E. Street, R.A., the newly-appointed architect to Salisbury Cathedral, prepared plans some few years ago for the entire restoration of the fine old Church of St. Thomas, Salisbury. The restoration of the chancel has already been carried out, and the new pulpit designed by him was erected last year. The restoration committee have under consideration the next steps to be taken. Mr. Street, it is understood, advises the roof being made safe and the walls being cleaned before other matters are proceeded with.

Building Intelligence.

MILTON, DEVONSHIRE.—The new church, dedicated to the Holy Spirit, has just (August 12) been consecrated by the Bishop of Exeter. It is in the Early English style, and is situated amidst one of the most lovely spots in Devon. It consists of nave, chancel, vestry, and south porch, and, although not large, is well adapted for the wants of the place. It is built of local walling stone, with Bath and Ham Hill stone dressings. The roofs are open, and of pitch pine. The nave is furnished with stairs. The stalls are of oak, and so is the chancel screen. The font is of Bath stone, and is copied from an ancient one in the neighbourhood. The stalls are carved, and bear armorial bearings—the Norris crest and that of the Croftons, with their motto: "Dat Deum incrementum." The pulpit is of Bath stone, and has sacred monograms, emblems, conspicuously I. S. upon its cants. The east window has three lights, and is filled with stained glass by Messrs. Fouracre and Watson, of Stonehouse, Plymouth. The subjects represent the baptism of Our Lord, and the Descent of the Holy Ghost, the gift of the Holy Ghost at Pentecost, and SS. Germanus and Lupus preaching upon the banks of the Tamar. The south aisle, 2 light windows, has also painted glass, representing the lily and the rose, by the same artist. Over the entrance porch is a carved tympanum, emblematic of the descent of the Holy Spirit; it is by Mr. Harry Hems, of Exeter. The fittings upon the altar table are very rich, and the lectern is of polished brass. Over the vestry door is a picture in needlework by Miss Meadows—subject, the Annunciation. The dimensions of the building are:—Nave, 37ft. 6in. × 20ft.; chancel, 20ft. × 15ft.; vestry, 12ft. × 11ft. The work has been carried out by Mr. Blowey, builder, of Buckland Monachorum, at a cost of about £1,600. The whole has been executed from the designs, and under the immediate superintendence of Mr. Edward Ashworth, architect, of Dix's Fields, Exeter.

NEWNHAM PADDOX.—On Monday week the foundation stone of a new Roman Catholic chapel at this place was laid. For a considerable time past extensive alterations and additions have been going on to Lord Denbigh's house. A new east wing has been added, in which are situated the private apartments. The front is now in process of being recased, and massive towers are being erected at the south-east and south-west corners. In the centre of the front there will be a new loggia, surmounted by a tower of considerable height for observation. The bricks have all been manufactured on his lordship's estate, and the dressings are of Bath stone. The chapel, which will be Gothic in style, will accommodate about 220 persons. The architect for the whole place is Mr. T. H. Wyatt, of London, and the work has been so far carried out by Mr. John Bromwich, of Rugby, under the supervision of Mr. W. J. Allen, clerk of the works.

WATER SUPPLY AND SANITARY MATTERS.

WATER FROM THE LOWER GREENSAND.—A boring for water, conducted on behalf of the Admiralty authorities by Messrs. Dowcra and Son, at her Majesty's dockyard at Chatham, has just been carried to a successful issue in circumstances of considerable scientific interest. The object was to reach the lower greensand, as advised by Professor Ramsay, the director-general of the geological survey, who, when consulted on the subject by the Admiralty a year ago, strongly recommended that the boring, which was then in the chalk, and yielded only brackish water, should be carried down through the gault, with the expectation that the lower greensand would thus be reached, and a plentiful supply of good water obtained. The boring having been continued accordingly, the lower greensand has been reached at a depth of 903ft. from the surface, and the water has risen so as to overflow the top of the well. Some years back Messrs. Dowcra and Son tapped the lower greensand at Chatham, but as the boring was very small it was continually choked by the sand. The subject is interesting geologically, and will also be viewed in relation to the water supply of the metropolis. A well at Loughton, in Epping Forest, has also yielded an ample supply of water from the lower greensand at a depth of 1,092ft., the locality being about four miles south-east of Waltham.

Intercommunication.

QUESTIONS.

[5482.]—Library.—Will some reader kindly inform me the way of getting at the correct size of a library to hold, say, 2000 volumes? I believe it is by the cubic or superficial tables; if so, how?—Young Architect.

[5483.]—Copies of Plans, &c.—A house has been completed from my plans and specifications. I apply to the contractor for the copies of the plans, details, specifications, &c., which I furnished him with, and he refuses to give them up. Can any reader say what's to be done? To me the matter is unprecedented.—Maiden City.

[5484.]—Discharge of Sewer.—How can I get the top and bottom velocity, and the quantity discharged, other than by algebra? Suppose a sewer 18in. diameter is laid, with a fall of 1ft. in 500ft., when running half and three-parts full.—J. H.

[5485.]—Mrs. Siddons' Portrait.—Could any reader inform me of the value of an engraving, by Haward, of Sir Joshua Reynolds, "Mrs. Siddons as the Tragic Muse?" I have heard it is very valuable, but am anxious to know its true worth.—E. F. D.

[5486.]—Removing New Appearance of Stone.—I am completing a new stone residence and other buildings, and there is a material prepared for the walls to take off the new appearance of the stone, &c. How can I prepare or apply it?—C. F. Taylor.

[5487.]—Party Wall.—Can I make use of the wall of an adjoining house, or is it necessary to build another; and, if so, what thickness should it be? The wall is finished with a parapet at top, and is considerably higher than the new house will be.—C. F. M.

REPLIES.

[5461.]—Stamped Agreements.—"G. H." is wrong in his reply as to the above. Every plan and document *referred to*, or being part of an agreement, must be stamped. I know the practice "G. H." names, of merely referring to a plan and noting it by number or letter, is common enough, but it will not bear the test of law. One stamp will cover a number of documents, such as plans and specifications, and agreements, but in such case they must be bound up together at time of execution, not lumped together afterwards. The safest plan to adopt is to forward all documents after signature to the stamp-office within the proper time for stamping. In complicated matters it is really the only safe course to adopt; in case of dispute as to validity of stamping the presumption is always against the documents, and they seldom stand. Note a case the other day where a number of contractors signed across a single stamp for same contract; it was held to be invalid. If such deed, however, had been merely sent to the stamping-office after the different signatures were affixed, only one stamp would be required.—B.

[5463.]—Light.—Will "Surveyor" further oblige me by giving some definite legal authorities in addition to his answer about light?—Architect.

[5471.]—Ventilation and Hollow Walls.—Let every room have an opening or openings into the hollow of the wall. These may be about breathing level, or near the floor, and be fitted with "hit and miss," or other kind of regulating valve. In addition to these a few air-bricks into the hollow should be inserted below in the outer wall. As regards drawing off the foul air vertical tubes should be introduced, communicating with top of each room by a valve, and be made to pass near a smoke flue, or be carried up independently. Nothing else is necessary to insure a current of air through the room.—G.

[5471.]—Ventilating a Room.—Make the fresh-air inlet at the floor level; if at more than one point, the supply will be distributed. If possible, carry the supply-pipe behind the fireplace, so that the supply of fresh air may in cold weather be warmed before it enters the room. The outlet for the foul air make on the opposite side of the room (or as nearly so as practicable). Try an Arnott's ventilator fixed close to the ceiling, with the valve carefully balanced (or it may be fixed on the chimney-breast). If possible, construct a shaft of any material in the wall-space from the ventilating exit or exhaust to the roof ridge, protected at the top from down-draughts. Each individual requires 10 cubic feet of fresh air per minute. The total area of all the inlet pipes must be about one-tenth more than that of the exhaust ventilator. The latter, made with an area of 1 square foot, will discharge 116 cubic feet of foul air per minute when the vertical distance from the inlet level to the top of the exhaust shaft is 10ft., and the difference between temperature of the room and that of the external air 5° F., and so on in proportion. If further particulars are desired, they shall be given.—Thompson Bell.

[5473.]—Tile Roofs.—A solution of corrosive sublimate (bichloride of mercury) has been recommended, ½oz. former to a gallon of water. The green vegetation complained of is more prolific in some localities than others, and I do not know of any simpler remedy.—G. H.

[5474.]—Tiles.—Tiles of any size up to 9in. square can be made in any pattern or colour suitable for the spandrels over window-heads or for string-courses, &c. Similar tiles have recently been made for an architect by us, and we should be glad to forward a sample tile to any one applying for the same; or similar tiles could be seen at these works, or London office, 24, Featherstone-buildings, Holborn. Tiles, ¾in. thick, price not more than 10d. per foot super.—Carter and Co., Encaustic Tile Works, Poole, Dorset.

[5477.]—Timber.—Botanically pine and fir belong to different genera, the former being called *Pinus*, and the latter *Abies*, although timber merchants and others, who are ignorant of botany, confound the two. The wood called Baltic fir is the Pinus Sylvestris, also known in the trade as red wood, and sometimes Memel fir, Dantzic fir, &c., from the port of shipment. The deals from this timber are called yellow deals. Yellow pine belongs to another species—viz., the Pinus Strobus of America, but known there as white pine. Baltic white wood belongs to the fir proper—viz., the Abies Excelsa, and is known by various names in this country, such as white deal, Baltic spruce, &c. Red pine is an American timber, botanically known as the Pinus Rubra, but, according to Hurst, it is a mere variety of the Pinus Sylvestris. Spruce timber is inferior to the so-called fir or pine, and it is difficult to say which is best—the American or Baltic spruce—as good and bad qualities of both come to the English market. A great deal of information on the subject will be found in Laslett's book on "Timber and Timber Trees," and in Hurst's and Tredgold's "Carpentry." Both writers are, I believe, in the Government service, and may be relied on. A very concise description of the most important timbers used in building is given in page 325 of the last edition of Hurst's "Handbook."—J. S.

[5477.]—Timber.—The terms "pine" and "fir" are frequently applied to the same timber among the trade. The pines and firs belong to distinct genera—namely, *Pinus* and *Abies*. The term Baltic fir is used for the red timber from the various ports in the Baltic Sea. Red pine and yellow pine (Pinus Rubra and Pinus Mitis) are grown in North America, and are two varieties of the same species. The terms red and yellow are often used interchangeably, though they are different kinds. White pine is known in England as yellow. I believe white deal, or white fir, is imported chiefly as deals and battens. European spruce is the same wood as that known as white wood. I think I have answered most of "Wood's" queries—some I cannot definitely reply to. As he says there is considerable confusion in the terms Baltic white and red wood, which it would be a great assistance to the student to clear away, I have felt considerable doubt about some of the terms, and only experience can solve the difficulty. Swedish timber is not quite so durable as Russian or Prussian.—Student.

[5480.]—Sketching Tour.—Supposing you have seen St. Saviour's, Southwark, St. Bartholomew's, Smithfield, &c., and other places in London, then proceed to Eltham (old palace), on to Greenhithe (for stone church), Milton (church), Rochester (castle and cathedral), Maidstone (Leeds Castle), Ightham Moat House, Sevenoaks (Knowle House), Canterbury, Croydon (church and palace), Beddington. Except Canterbury this circuit comprises places all within about 30 miles of London.—Carl Budge.

LEGAL INTELLIGENCE.

The Employment of Children in Brickfields.—At the Sittingbourne Petty Sessions on Monday, Mr. George Lee, brick manufacturer, Milton, was summoned by Mr. Redgrave, sub-inspector under the Factory Acts for this district, for employing a child in his brickfield, and failing to produce a certificate of his attendance at school. Defendant, who admitted the offence, was fined 40s.—Another case of a similar character against Mr. Lee was withdrawn, on his paying the costs.—Messrs. Charles and Benjamin Burley, brick manufacturers, Sittingbourne, were also summoned for employing in the manufacture of bricks a girl named Mary Ann Young, under the age of 16 years. This case was a rather peculiar one, as it appeared that the girl, who is 13 years old, was introduced into the brickfield clandestinely, and without the knowledge of the defendants. Mr. Redgrave found her at work in the brick-making shed, and there was an attempt on the part of the others there to hide her. Under the circumstances the bench fined Messrs. Burley £1 and costs.

STAINED GLASS.

Preston.—The Fisher memorial window in the west end of St. James's Church, Preston-lane, was uncovered on Saturday evening. It is the work of Messrs. Hardman and Co., of Birmingham, and was executed from the designs of Mr. J. Hibbert, of Preston. The subjects are from the life of David, the central figure showing the Psalmist with his harp; in the one side light are depicted David and Jonathan, with a boy in the background carrying arrows, and in the other the last interview between David and Jonathan.—A new chancel is about to be added to this church at a cost of £2,000.

CHIPS.

The Lords of the Committee of Council on Education have determined to award bronze medals to students who obtain a first-class in honours in any subject of science at the May examinations.

Prof. Kerr is the author of a new work about to be published, entitled "Model Plans and Country Houses." This is by no means a new subject with the Professor.

At the first statutory meeting of creditors of John Oliver, of 88, Cold Harbour-lane, Camberwell, builder, the receiver and manager's statement of affairs showed liabilities owing to unsecured creditors, £12,694 4s. 10d.; debts fully secured, £20,500; and assets, £11,817 6s. 1d. The meeting resolved to accept a composition of 3s. 4d. in the pound, payable by three instalments—viz., 1s. in a month from registration, 1s. in 3 months, and 1s. 4d. in 6 months.

Memorial stones of a new Primitive Methodist chapel were laid at Withernsea, East Riding, on Monday week. Mr. W. H. Freeman is the architect, of the new building, which will seat 450 persons on floor area and end gallery, and is Romanesque in style.

St. Paul's Church, Clacton-on-Sea, was consecrated on Thursday week.

On Sunday services were held at Ferrybridge in connection with the opening of a new Primitive Methodist chapel. It will accommodate 250 worshippers, and has been erected at a cost of about £350. The building is of brick, with stone dressings. The contractor entrusted is Mr. Thomas Parker, of Castleford.

On Tuesday a new church, dedicated to St. Joseph, was consecrated at Maesbrook, in the parish of Kinnerley, Shropshire. Mr. Haycock, of Shrewsbury, was the architect, and Mr. Yates, of Shiffnal, the contractor. The total cost of the church, which will accommodate about 150 persons, was a little over £1,900.

The Town Council of Beverley have adopted a report from a committee, stating that it is expedient to appoint a borough surveyor who shall devote all his time to the duties of his office, and that three months' notice be given accordingly to Mr. Beaumont to terminate the present arrangement. The salary to be offered for the entire services of the new surveyor is £140 a year.

Important works of alteration and enlargement are about to be carried out at Berechurch-hill, near Colchester, recently purchased by Mr. Octavius Coope, M.P. The architect is Mr. Ernest Lee, from whose designs was rebuilt, also at Mr. Coope's expense, the church of St. Mary, Whitechapel.

New Co-operative Stores and Public Hall are being erected at Horbury. The stores will cover an area of about 3,500 superficial feet, and the total cost will be about £4,000. The style is Gothic. The design has been prepared by Mr. C. W. Richardson, architect, of Wakefield.

The annual meeting of the Sussex Archæological Society was held on Thursday in last week. A large party proceeded by rail from Hastings, and after visiting Icklesham and Udimere churches proceeded to Breed Church, a place about 4 miles from Winchelsea. In the dining-room of Breed-place a series of papers were read upon Cambor Castle, Rye Town, and the antiquities of Breed-place.

A Local Government Board inquiry was held at Doncaster, on Tuesday week, before Mr. S. J. Smith, C.E., inspector, as to an application for sanction to borrow an additional £70,000 for the completion of the new waterworks at Ravenfield, belonging to the Corporation. Mr. Brundell, C.E., engineer for the scheme, explained the plans, and said that £80,000 had already been expended by the Corporation.

The work of converting into a pleasure-ground for the people the late neglected and unsightly churchyard attached to the old church of St. Mary, Newington Causeway (now removed), was commenced a few weeks ago. Several monuments surrounded by iron railings will be allowed to remain in their original places, and others which have fallen into decay are being renovated. The grounds are ornamented by a lofty clock tower, erected a year ago by Mr. R. S. Falconer and which is believed to stand on the site of the Saxon church mentioned in "Domesday Book" in connection with Walworth.

On Wednesday the Romford Board of Health discussed the respective merits of gas and oil for lighting the public lamps of the town. Both systems have been tried. Last year the saving through using oil was £125, but this year less will be required for plant, &c., and oil is 2d. per gallon cheaper, so that a probable saving of £200 is estimated. It was agreed to continue lighting with oil, and the tender of the gas company was rejected.

The Oldbury Local Board on Wednesday decided to accept the tender of Messrs. Reed and Jeavons for the construction of sewage outfall works, at a cost of £4,638 12s.

Our Office Table.

A BUILDER named Willsmer, at Leyton, was recently fined for infringing the byelaws in connection with the erection of seven shops and houses in the Park-road in that village. He had been previously warned by the Local Board that the wretched construction of the buildings would necessitate their demolition, but he seems to have set all authority at defiance, and hastened the completion of the work. Last week he was ordered to attend a meeting of the board, and in default of any satisfactory explanation or assurances on his part, the board very properly ordered the instant demolition of the whole of the buildings. On Saturday accordingly, the houses, which are declared to be "the most disgraceful set of buildings ever put up in the parish," there being, to all appearance, "not a single whole brick in the front, and walls," were razed to the ground, the job altogether being accomplished in less than half a day.

It seems probable that the old system of glazing with putty, so far as roofs are concerned, will soon become a thing of the past. We have, during the past two months, noticed two very good systems of glazing and roofing, which are being largely adopted with good results, and we have now before us another method of accomplishing the same object, patented by Messrs. Shelley and Co., of Swansea, which has many good points about it. The advantages gained by the adoption of the system are manifold. The cost saved in materials and labour is considerable, and the neat finish of the work when completed, and the protection afforded to all perishable materials employed in the construction of the roof, leave nothing to be desired. The system is applicable to almost all angles of roofs, and is also equally effective in vertical positions.

MR. JAMES LOVEGROVE, C.E., the chief surveyor to the Hackney Board, has published a voluminous report on the progress made in his district during the financial year ending Lady-day, 1878. We gather from this report that there are now upwards of 77 miles of highways under the board, against 30½ miles in 1856, and that many miles of roadway have been paved to the full or part width with granite pitching, and that nearly 50 miles have been repaired with ballast or flints. The surveyor describes the *rationale* of road repair, and shows that the mode of repair depends on the character of the traffic. He says truly "good roadmakers are impatient if the stones or ballast do not go down, because they know that the repair is incomplete," and hence, when the traffic is insufficient to crush part of the material, or bind the new material, they scatter over the gravel a quantity of gritty road sweepings, to help to bind it. Mr. Lovegrove disapproves of this plan, and advocates a compact and hard material, the use of a coarse or angular ballast, such as flints, instead of fine road sweepings, as being less liable to work up as mud. Steam rolling is recommended. From a table of cost of repairs to roads by steam roller it appears that, including labour, watering, granite, &c., the cost varies from 9¾d. to 1s. 9¾d. per yard superficial. We next pass on to the heading "Sewers," in which the report speaks of the recent flood Hackney was subjected to last April, which submerged many basements and roadways, and is attributed to the insufficient capacity of the Great Northern High-level Sewer. The report shows that 9¾ square miles of the Great Northern High-level area have to discharge its rainfall through Hackney, instead of, as formerly, into the old River Fleet Valley, and that no storm overflow is provided for, and it suggests then ecessity of relief to prevent the flooding of the lowest portions of the area. A return of the houses drained by application from 1856 to 1878 shows an increase on the total number of quite 50 per cent. during the last year. We find also various roads and streets have had their footpaths paved by the Limmer Asphalte Company, by Mr. Leopold Steible, and by the Société des Asphaltes Française, guaranteed for periods from ten to six years. Mr. Lovegrove's report is interesting as showing the progress made in one of the most populous districts of the metropolis.

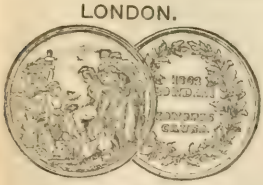
MESSRS. MACNAUGHT, ROBERTSON AND CO., of Bankend, Southwark, the well-known manufacturers of iron girders and other constructive metal-work, have just issued another catalogue of their manufactures that will be found of everyday service to architects and engineers. An alphabetical index is given, so that any class of goods can be immediately referred to and their prices found. Thus we find angle irons of all sizes, rails of iron and steel, rivetted girders, besides the weights per foot, and a table of safe loads in tons and cwts. of rolled iron joists. Thus we find a rolled iron girder of 10in. × 5in. × 5in., 20ft. bearing, can safely carry 7 15-20 tons distributed. The trade list for iron tubes and gas fittings will be found of constant use, as will also the lists for pulley blocks, &c. Messrs. Macnaught, Robertson, and Co., also manufacture Harris's wrought-iron windows, suitable for dome and roof lights, warehouses, and factories. The sections of the rebated casement bars appear to be well contrived to prevent the ingress of wet. These bars and frames have flanges or not to suit different openings. Ornamental bosses are cast at the junctions of squares, and various styles of windows are kept in stock.

THE controversy on the subject of St. Alban's Abbey, roof, and ceiling, continues. Mr. E. P. Loftus Brock, F.S.A., the Hon. Sec. of the British Archæological Association, in a long letter in the *Times* of Monday last, endorses the protest of Lord Carnarvon on behalf of the society he represents. Mr. Brock, while very anxious to preserve the ceiling, which he scarcely need have informed us is ancient, considers the roof over the ceiling a secondary matter, and being dilapidated and of a bad form should be removed. He refers to the necessity of covering such a flat roof with lead, the use of which prevents the circulation of air, but not the transmission of heat, and accelerates decay from the condensed vapour confined. Mr. Brock suggests a high pitched roof as the best, though he does not suggest the form of construction best adapted, nor prove it to be the cheapest form. As to covering with Coniston slates Mr. Brock thinks the large mass of unpronounced colour will not harmonise with the grey and red walls. He advocates something deeper and warmer, and thinks Broseley or Staffordshire tiles would be more in keeping. He also suggests cross-boarding above the fragile work of the ceiling, and a gable of timber work set back from the west stone front, and well leaded. The writer disagrees with the anti-restorationists in this matter, and in conclusion adds a word for the retention of the old carved pulpit, and says he hopes it is the last witness in any church of the false principle of church restoration which demands the expulsion from its place of every object not 300 years old or of Gothic style. Mr. Edmund Beckett follows with another letter, in which he stigmatises Archdeacon Grant's "parting kick at the contractor, Mr. Longmire," as discreditable to a man who has done so much, and speaks in commendation of Mr. Longmire for honestly saying the roof was too rotten to be repaired. Allusion is also made to the archdeacon's reflections on Sir Gilbert Scott's sons, and to his endeavour to eject them for another architect because they have recommended a high roof. Mr. Owen W. Davis, canon of St. Alban's, and secretary of the Archæological Society, differs from Mr. Evans, who asserts that a flat external roof existed over the eastern bays of nave, and he asks what became of the roof over the remaining Early English bays of Abbot Trumpington? He further says: "If Mr. Evans's arguments that the weatherings on the tower show the position of the Norman roof without a parapet, and with eaves only, is good for anything, it must show that a pointed roof did not co-exist with an Early English clerestory and parapet, and we should thus get the remarkable antiquarian fact that a Tudor roof, allowing it to be even so old, was put on by Early English architects!" Mr. Davis presumes Mr. Evans thinks the ancient builders worked with moss and lichen as well as flat roofs.

THE Rev. C. A. Fowler writes from Spires advising all who are interested in the proposed decoration of St. Paul's Cathedral to visit the cathedral, Spires, which he considers a suitable example to be followed. It has just* been restored and polychromed, and does infinite credit to modern German art. The colouring of the magnificent nave is kept under, and almost all the colour is concentrated on the dome and choir, with the exception of the roof, and exquisite mural paintings of sacred and historical subjects in panels over the arches and under the clerestory windows. Mr. Fowler could not detect any mosaic work except in the various altars, but the polychroming of the whole is by far the best which he has seen anywhere in Europe. Although there is not a white spot

* Our personal knowledge is not recent enough to contradict Mr. Fowler, but we fancy he is mistaken in describing the cathedral as "*just* restored."

LONDON.



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throughout the choir yet the tones are so artistically rendered with gold groundwork that it presents no garish effect—differing in this from its sister cathedral at Worms, of the same date, and probably by the very same architect, where the colours are crude and badly toned. It is singular that in two cathedrals only two or three hours apart the modern work should be so good in the one and so execrable in the other; but so it is. With regard to this cathedral of Spires, Mr. Fowler says it is hard to say which is the most creditable to the architect, the colouring or the exquisite designs and forms covering walls and ceiling, and he would suggest by all means a visit from the committee before they come to any final decision in their own minds as to the decoration of St. Paul's.

Last week the Bideford Fine Art and Industrial Exhibition was opened. The exhibition generally is superior to that of last year. Mr. Harry Hems, of Exeter, exhibits some sculpture. For the articles sent in for competition the committee have awarded ten silver and twenty bronze medals, besides £26 in money prizes. In oil paintings the silver medal is awarded to Mr. G. R. Cooke, for a painting of Clovelly Harbour, and the bronze goes to Mrs. B. Davie, of Bideford, for her "Killarney," with certificates of merit to Mr. Sheat, of Exeter, on a picture of Darkham, on the Torridge, and to Alice Horton for her "Fisherman's Daughter." In water-colours the silver medal has been awarded to Mr. H. R. Babb, for a picture on the coast near St. Germans, the second prize going to A. W. Perry, for a picture of flowers from nature, and certificates to F. P. Hopkins and C. Taylor. A silver medal for etching has been given to W. Stratton, a lad of fifteen. In the Bideford School of Art competition a silver medal goes to A. Callinson, bronze medal to A. How, and certificates to A. How, C. Veal, and E. M. Rude. For carving and sculpture a silver medal has been awarded to Mr. Hems; bronze medals to Mr. W. H. Mears, of Exeter (pupil of Mr. Hems); Mr. Bond, Bideford, and Mr. D. B. Dunsford; and certificate to T. Lock. The architectural bronze medal goes to R. Bryden, and the photographic bronze medal to Catford and Murphy. For leather work J. H. Borne, Bideford, gets a bronze medal, and W. Braund a certificate. The exhibition remains open until the 31st inst.

The Museum of Decorative Arts was opened on Monday afternoon at the Pavillon de Flore at the Tuileries. This new institution is for the present a private undertaking, but it has been called into existence under the patronage of the French Government to enable France to keep pace with our countries, as, for instance, with England, Austria, Belgium, and America, in the employment of every possible means for the development and progress of art industry. It has, therefore, been deemed necessary to create an institution similar to the South Kensington Museum in London, and to imitate the principles that have guided its direction, not only in the collection of models of architecture, sculpture, paintings, drawings, fixed and moveable decorations, furniture, mosaics, ceramics, glass, clothing, jewellery, arms, scholastic instruments, books, &c., useful for the instruction of artisans and others engaged in the study and manufacture of articles of art industry, but also in adopting the English system of sending the *chefs d'œuvre* of the museum into the provinces, by arranging and encouraging numerous and frequent exhibitions throughout the country. The opening of this new institution was limited to five or six picture galleries, exhibiting numerous admirable works of the old and modern schools belonging to friends of the undertaking. The exhibition is supported by voluntary contributions. The French Government has given encouragement by placing the Pavillon de Flore at the Tuileries at the disposal of the association.

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The fasteners are brass or copper. The peculiar arrangement of the glass covers the whole of the woodwork, and only the small fastener is visible; therefore the roof is indestructible, and outside painting unnecessary. The squares of glass can be easily removed, and the whole taken out and cleaned by any inexperienced person. Breakage is impossible except through carelessness or accident.

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Old roofs may be re-glazed on this principle, and roofs are covered with slates or zinc on this system.

Extract from BUILDING NEWS: "Mr. T. W. Helliwell, of Brighouse, has recently patented and introduced a new system of glazing and covering roofs, which is certainly superior to anything of the kind we have seen before . . . . and it will, in our opinion, supersede any other system before the public."

Important references and all particulars from the patentee, T. W. HELLIWELL, Brighouse, Yorkshire; and 19, Parliament-street, London.—[Advt.]

TENDERS.

Bristol.—For Board Schools at Crews Hole for the St. George's School Board. Mr. Stuart Colman, of Bristol, architect; quantities by Mr. Deane, of Bristol:—

Walters, E.	£998 10 0
Wilkins and Hill	968 0 0
Price, B.	910 0 0
Wilkins, R., and Sons	895 0 0
Banner, Wm.	884 0 0
Crick, John	877 0 0
Hatherley, E. J.	868 0 0
Cowlin and Son	850 0 0
Forse and Ashley	827 0 0
Veales, Wm. (accepted)	729 0 0

Bermondsey.—For painting and decorating offices for Messrs. Peek, Frean, and Co., Drummond-road. Messrs. Snook and Stock, surveyors:—

Arrowsmith	£798 10 0
Homan and Son	678 0 0
Pritchard	623 0 0
Heebs	571 0 0
Lachlan	535 0 0
Greenwood	486 0 0
Ryder and Sons (accepted)	438 0 0

Bristol.—For additional accommodation for 200 children at Ashton-gate Board Schools for the Bristol School Board. Mr. Stuart Colman, of Bristol, architect; quantities by Mr. Deane, of Bristol:—

Veals, W.	£795
Hatherley, E. J.	694
Eastabrook, Wm.	694
Wilkins, R., and Sons	653
Beaven, A. J. (accepted)	598

Derby.—For the erection of stores, stabling and shedding at the Central Depôt, Ford-street, Derby (contract No. 1), for the Derby Urban Sanitary Authority. Mr. Clement Dunscombe, C.E., borough surveyor; quantities supplied:—

Bridgart, R. (accepted) [Fittings not included.]	£5,183

Derby.—For the erection of a district police-station, Bloomfield-street, Derby, for the Derby Corporation. Mr. Clement Dunscombe, C.E., Corporation surveyor; quantities supplied:—

Bromage, F. (accepted)	£1,470

Duckpool Bridge.—For three arches of brick and stone, for the Bardney, &c., Drainage Commissioners, over their main drain on the road leading from Bucknall to Stixwould, in the county of Lincoln. Drawings and quantities by Messrs. J. S. Padley and Thropp, civil engineers, Midland Bank-chambers, Lincoln:—

Semper, J.	£1,399 19 0
Walter and Hensman	935 0 0
Chapman, T.	930 0 0
Binns, F.	790 0 0
Hatchiffe and Bell	727 0 0

East Barnet.—For road-making and surface water drains for the British Land Company, Limited, on their estate at East Barnet. Mr. Henry B. Mitchell, surveyor:

Richardson	£1,400 0 0
Keeble	1,387 0 0
Crockett	1,366 0 0
Harris	1,355 0 0
Killingback	1,270 16 0
Pizzey	1,255 0 0
Jackson (accepted)	1,222 0 0

Felstead and Rayne, Essex.—For the erection of new schools in each village for the School Board for Felstead and Rayne:—

	Felstead.	Rayne.
Cornwell, W.	£2,070	£1,843 0 0
Smith, J.	—	1,695 0 0
Gozzett, H.	1,772	1,665 0 0
Brown, Jas.	1,850	1,625 0 0
Parmenter, S. C.	—	1,611 0 0
Peake, Wm.	1,635	1,575 0 0
Brock, Jno.	—	1,748 10 0
Holland, George	1,848	—

[Mr. Gozzett's tender accepted for Felstead, and Mr. Parmenter's for Rayne school.]

Hadley.—For road making, sewers, and surface water drains, for the British Land Company, Limited, on their estate at Hadley, Herts. Mr. Henry B. Mitchell, surveyor:—

Richardson	£3,100
Keeble	2,816
Crockett	2,795
Harris	2,679
Killingback	2,675
Jackson	2,570
Pizzey (accepted)	2,499

Nottingham.—For new buildings and alteration to premises, Parliament-street, Nottingham, for The Guild Institute Company, Limited. Mr. S. Dutton Walker, F.S.A., architect:—

Vickers	£824 0 0
Lynam	768 8 0
Fish	765 0 0
Messam	721 0 0
Underwood	717 0 0
Bell and Son	705 0 0
Jelley	680 0 0
Stevenson	646 0 0
Bailey (accepted)	598 5 0

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IN VARIOUS DESIGNS AND GAUGES.

WROUGHT IRON TANKS,

PAINTED AND GALVANISED, OF IMPROVED MANUFACTURE.

CORRUGATED IRON,

GALVANISED AND BLACK, IN ALL GAUGES, KEPT IN STOCK. ZINC WORK OF ALL KINDS.

FITZROY WORKS, EUSTON ROAD, LONDON, N.W.; Hatton Garden, Liverpool; Great Clyde Street, Glasgow.

THE BUILDING NEWS.

LONDON, FRIDAY, AUGUST 30, 1878.

SOMERSET HOUSE & EIGHTEENTH-CENTURY DECORATION.

FEW who pass up and down the Strand or enter the quadrangle of Somerset House ever cast their eyes upon the unique vaulted ceiling of the triple vestibule which forms the entrance to the building. Just now the presence of a scaffolding for students engaged in making a measured drawing of the work in question has suggested to us a comparison of eighteenth-century work with that of the present cycle. Our progress in decorative art since the days of Sir William Chambers has been rather one of eclectic copyism than of development. We cannot fail to observe a loss of synthetical power of design, and that our architects have been borrowing and copying from almost every source within their reach. In decorative design the extraneous element has been prominently and aggressively brought to our notice in our new buildings, as in our exhibitions of art and skill; and even the Paris Exposition has been described by one critic as containing works in which the shopkeeping element is offensively prominent. But the circumstances of the eighteenth century were different. The architects of George III.'s reign were few, but on that account none the less successful. Thus Carr, of York, built scores of noblemen's houses; Sir Robert Taylor was engaged on the Pelican Office, Lombard-street, a villa at Richmond, Ely House, Dover-street, and a bridge at Henley; Stuart and Revett, introducing a taste for Greek art, were patronised by many of the nobility; and Robert Adam, the author of a work on Diocletian's palace at Spalatro, implanted a taste for a less severe but particularly chaste style of decoration in numerous domestic buildings. Among them Keddlestone Hall, Derbyshire, and the Adelphi may be mentioned as the chief. But Sir William Chambers was undoubtedly the leading architect of the era, despite the opinion of many critics who have sought to undervalue his genius as an architect. His treatise on the "Decorative Part of Civil Architecture" influenced considerably the architectural work of his age, and is even now an esteemed authority; but his great work was Somerset House, the beautiful Doric vestibule of which has been generally admired for the purity of its detail. Robert Mylne, the architect of old Blackfriars-bridge, George Dance, who designed the Mansion House and Newgate Prison, Henry Holland, the designer of Claremont and Carlton Houses, and James Wyatt may also be named as contemporary architects whose works attest thoroughness, if not the knowledge of Classic detail we discover in Sir William Chambers's great work in the Strand. Notwitwithstanding our classical revivication of eighteenth-century architecture, it will be difficult to find a counterpart to the unique vestibule which leads thereinto. We confess frankly we have nothing like it elsewhere in London, though we might imagine what the arched entrances would have been to Inigo Jones's royal palace at Whitehall if his grand quadrangle had been carried out. Neither have we anything comparable with the fine river front of Somerset House—its well-balanced parts, open loggias, and rhythmical succession of features—in any of our later reproductions in the Italian style. But, to confine our attention to the vestibule entrance from the Strand, we may inquire what constitutes its surpassing beauty as a work of art? Perchance the period of its inception was in its favour. Chambers lived in a day when the rivalries of conflicting art creeds were not known. The classical revival had come down as one unbroken tradition from the 16th century; Vitruvius, Palladio, and Vignola were still cherished as the fathers of architectural art, and their canons and rules were observed with unswerving faith. Chambers, though he published sundry works and designs after Chinese and Moorish models, was too well schooled in Roman and Italian to allow mere caprice to influence his work, while the importation of the French classicalism helped to check an unbridled fancy. This was not all. The brothers Adam were contemporaries, and had introduced a species of refined ornamentation bordering partly on Roman and partly on the Classical school of the French Empire. Somerset House, we may just observe here, was commenced in 1776, upon the site of Protector Somerset's Palace, resembling it somewhat in feature, and was 14 years building, as was stated in a report laid before Parliament in 1790. According to Brayley's account in Britton's "Public Buildings of London," half a million of money was expended upon it, though Chambers's estimate was only half that sum. However, we look at the result, and not at the cost. The admirable proportions and beauty of detail of the Strand front, the elegant vestibule to the great court-yard, the most beautiful quadrangle in England of the kind, the recessed centre, and the pierced upper porticoes over the semicircular arches in the river front, impart an air of classical dignity and refinement we cannot match elsewhere. But Chambers's work was abused in his own day. Even the entrance arcade has been said to have been borrowed from the *Strada della Dora Grassa* at Turin, and has been pronounced too narrow; the entablatures of the vestibule have been described by the writer quoted in Gwilt's edition of Chambers's "Treatise on Civil Architecture" as cyphers emblematic of royalty. "Surely no true subjects can approve of annexing the character of cyphers to such august personages. If there is any novelty or genius," says this writer, "evident in this sportiveness of fancy, it is so thoroughly republican and indecent that it should be immediately effaced." So wrote one of Chambers's critics on the most successful feature of Somerset House. Carlini, Wilton, Geracci, Nollekens, and Bacon were the sculptors employed on the exterior, and the decoration of the groined archway was, no doubt, due to one or more of these artists. Another reason for the superiority of Chambers's work was that it always aimed at simplicity and true elegance of style. Even Mr. Fergusson, who does not award unqualified praise to the building we are referring to, yet owns that its architect was the most correct and painstaking architect of his century. Looking up at the vault of the entrance vestibule we find the spaces relieved in the most simple manner, the arches being enriched on their soffits by bands of the Greek fret, and the main cross arches to the centre opening dividing the vault into compartments enriched by a double band of the same ornament. Beyond the simple mouldings and corner ornaments of the panels there is nothing rococo or offensive to the most correct taste, nor is there visible any attempt to be painfully academic or precise. The Louis Quatorze style had barely influenced the English school of artists, and Chambers, as well as his contemporaries, the Adams, maintained a *via media* between the ultra-Classical and what we may designate the free Classic school. Probably Chambers and the Adams had become embued with the style adopted at the Louvre, or the works of Perrault and Mansard—architects who appear to have thought and designed with equal freedom. Chambers was not a blind admirer of the Parthenon, from all accounts, and yet his work is particularly correct and elegant. The Adams, though they may not have been indebted to French inspiration, display some of the higher qualities of decorative design, always more subjective and conventional than otherwise. If we look at the Adelphi-buildings, designed by them, and especially if we examine the interior treatment and decoration of the houses in that neighbourhood, known, no doubt, to many of our readers, we can scarcely fail to realise a mental impress in the work—a power of combining and controlling detail that the architect who has merely studied art by the analytic process does not possess. The orders are sparingly used, the windows large and grouped, and the ornamental accessories superficial, and restricted to certain portions of the design. In many of these houses we find charming instances of superficial ornamentation, always refined and free from coarseness, and well adapted for plaster and internal decoration. The ceilings are generally relieved by small projecting cornices, flat friezes, of wreaths and festoons against the wall, and a simple scalloped pattern in the corners or round the ceiling. The door architraves and chimney pieces are particularly characteristic of these architects; so much so, indeed, that the style has been lately revived by the decorative artist. The mouldings are invariably small, the carving restricted to points, and made subservient to the architectural forms. The archway or vestibule we have instanced shows an analogous treatment. It does not crush the Doric columns below by its weight of ornamentation. The ceiling compartments are not divided by heavy cross arches, but are composed of flat bands and frets, varied in the most pleasing manner. The soffit panels are large and open, the angles relieved by simple patera; the mouldings are small and superficial in character, and the ornament, instead of being profuse and offensively prominent, is elegant and devoid of all ostentation. With the exception of a few buildings by well-known classical hands we can point to few modern instances where the purity and elegance of detail is so conspicuous. It is not far to seek the cause in the rage for novel combinations of style and detail, and in the lavish and undiscerning use of carved ornament. With Chambers and the brothers Adam it was not a question how to cram into a given space the greatest amount of sculpture, carving, and colour, but rather where to place it with perspicuity and effect. It was with them not a question of quantity, but of quality and discrimination, and they took as much pains in defining the points for ornament as Addison, Johnson, or Pope did with the construction of their sentences and the rhythm of their periods. In the architecture and decoration of the eighteenth century, as in its literature, we find an antithetic style, sometimes, it is true, rather ostentatious, but generally high-toned and elegant, and always presenting evidences of carefulness and study which are too often lacking amongst ourselves.

THE LOAN COLLECTION OF ANTIQUITIES AND FINE ARTS AT THE PARIS EXHIBITION.—II.

IT would be hard to over-estimate the value of the Greek pottery shown in the second and third rooms. Here we have superb specimens of the principal styles, and of almost every known era—vases, &c., from Smyrna, Ephesus, Rhodes, Cyprus, &c. Many are of the most important size, and of extraordinary choiceness of workmanship; some are even chastely gilt. As far as we remember, there is only one such example in the British Museum Collection. Of course it is im-

possible to speak particularly of so extensive a series. An early Kylix, with Bacchic dance, on the left of the second room, is wonderfully spirited. Several of the pieces are named, and, as in our own galleries, they are of very superior drawing and finish. For example, one piece bears the inscription, ΑΧΡΥΛΙΟΝ ΕΠΟΙΗΣΕΝ.

But what will arrest the attention of all beholders is the charming pottery, discovered principally at Tanagra, in Bœotia. France seems to have been especially fortunate in securing the prettiest pieces of this highly-refined terra cotta. We have here, as well as in the Louvre, cases full of the most beautiful statuettes, and groups excellently coloured and gilt. The grace and elegance of most of these is surprising. They suggest, too, what a loss the world has sustained by the total destruction of all Greek paintings. MM. Rayet and Lecuyer possess delightful specimens, and the subjects are as varied as beautiful. We have dainty Grecian maidens in all their charm of manner and costume, gods and goddesses, Silenus attending the youthful Bacchus, Hercules and Omphale, Venus and Cupid, and, representing the comic element, grotesque figures in comparison to the quaintness of which the extreme efforts of Callot are tame. There are several of the original moulds in which these figures were cast—one of a comic face which would do well for *Punch*.

The third room, containing the collection of M. Julien Gréau stands out conspicuous even in this glut of fine things. The bronzes and pottery are superb, there being no less than 23 Rhytons, all as fine as possible. One of his cases contains very choice glass — some fine fragments of vessels ornamented in a similar manner to the Portland Vase—the glass being blown or cast in onyx-like layers, and then carved like a cameo. There is, in this case, an almost perfect catacomb glass bowl, with a picture in gold between the two plates at the bottom, the rest of it being plain transparent glass. Several of the pottery figures in this room are unsurpassable, especially a priestess of Venus, and Venus herself seated upon a rock, talking pleasantly to her boy, who with one foot on the rock, rests with the right knee on her lap, and listens in joy to her commands. Both figures almost speak.

The rich and extensive display of ivories would have been more instructive if all could have been shown together, instead of their being put into separate cases, with other articles belonging to the same owners. The chief exhibitors are M. Castellani, M. Stein, M. Seilleur, Mdlle. Fillon, the museums of Boulogne, Lyons, Chambery, and Dijon, and M. Basilewski, who has a whole room to himself, containing splendid examples of almost every kind of Mediæval and Cinquecento objects of art. It may be as well here to say that it is situated in the fifth room, and is divided into three sections. On the right are enamels and pottery, in the middle of the room ivories and various interesting items, and on the left splendid specimens of goldsmith's work.

The earliest ivory is a classical piece belonging to Mdlle. Fillon, in Room 1—a statuette representing a tragic actress in buskin, with high soles and a tragic mask. It shows well how it was worn. The original colour of the dress, a pure turquoise blue (a pattern being engraved through to the white ivory), still remains, nearly as fresh as ever. There are a few fine Eastern ivory pyxes, one in the tenth room belonging to M. Maillet du Boullay, and three with gilt mounts, formerly belonging to one of the Duchesses of Burgundy. The Museum of Lyons, Room 4, shows a triptych of a curious type, 14th century—when shut it forms a statuette of the Virgin and Child. In the same casa is a very good diptych of the 10th century, with an elegant border, representing the Three Kings—1st, adoring the infant saviour; 2nd, in bed together, with the angel appearing over their heads; 3rd, their hasty flight into their own land. There are many others worthy of notice, especially a graceful triptych of the 14th century (French), which has flat doors for wings, with subjects painted in gold instead of being carved.

Room 5 contains the most extensive series, beginning with a portion of a casket carved with Cupids, said to be of the 1st century. The leaves of consular diptychs in bone appear to be of doubtful authenticity; but there is a good circular box of the 4th century, and a most important holy-water situla used for the coronation of Otho III., 11th century. Then comes a single plaque of Simeon, 12th century, of great dignity, with the inscription "Accepit eum in ulnas suas." The noble polyptych, numbered 93 on the ivory, said to be 13th century, but which we should rather consider to be early 14th, is of unusual size and beauty. It is divided into two stories, each containing three canopies. The upper part represents the Saviour in majesty, sitting on the rainbow, adored by the heavenly hosts; the lower, the Blessed Virgin, with an angel bearing a candle on either side. On the doors are the Annunciation, Salutation, Nativity, and Presentation in the Temple. It is altogether a most important work (100). A 14th century French diptych, with scenes from the Passion, is unusually descriptive. The figure of Judas hanging himself is curiously literal. Baron Adolphe Rothschild exhibits one of the best single figures—it represents one of the Prophets. Of statuettes there are very charming examples—one a beautiful Madonna and Child, with crown richly jewelled, of the first half of the 14th century. We may notice, in passing, that in the fourth room there is one of the earliest crucifixes carved in wood that have come under our notice. It seems to be about the beginning of the twelfth century, and still bears traces of the old distemper colour. The feet, of course, are nailed separately, and not crossed, as in later representations. One of the most curious carvings is a huge reindeer's antler, with its rough surface removed and the ridges beautifully ornamented with a border formed of birds, animals, and foliage. It is supposed to be of the twelfth century. What could have been the use of it is very hard to say; the workmanship is skilful, and the pattern artistic. MM. Alph. and Gust. Rothschild's statuette of St. George and the Dragon is attributed to François Duquenois, and is quite fine enough to be his work. The arms, dress, and dragon are in chased silver-gilt over the ivory. Fully to describe the ivories scattered about the rooms would take a volume: suffice it to say that we have famous horns, chessmen, draughtsmen (some as early as the twelfth century), triptychs, figures in abundance. The mirror cases are especially admirable, and are ornamented as usual with love scenes, games, and the like. The visitor will see some beautiful ivories as far down as the tenth room, where the cases belonging to M. Maillet du Boullay and M. de Bligny are placed. Those who are interested in the subject of colouring statues will do well to study M. Odiot's remarkable figure of St. Francis of Assisi, carved in wood and decorated by Alonzo Cano. It has, however, been exhibited in England. The treatment is somewhat too hard and realistic, but that only shows the difficulty of the matter. To colour statuary well requires all the powers of a good artist, and yet in the so-called restorations in France, as well as England, a fair house decorator has been considered competent to bedizen the carvings of the greatest sculptors of the fourteenth and fifteenth centuries! The work of the jeweller and goldsmith is represented in such abundance as to be positively embarrassing, and one feels here, perhaps more than in most other departments, the misfortune of separation and imperfect classification. The first piece we shall notice is a glorious reliquary called after the name of Elizabeth of Hungary. This splendid work has a rose-shaped foot, with circular translucent enamels, each surrounded by an inscription in Lombardic letters. From this rises the stem with knob decorated with enamel and niello. The reliquary itself is cylindrical, of crystal (?), lying vertically, above which rises a crocketed, pinnacled tabernacle, with saints in the niches. Angels support the outside buttresses; on the right is a figure of Henry II., Emperor of Germany, on the left of his Queen Kunegunda. All the inscriptions refer to them. Thus:—"Kunegunda Henrici Cæsaris uxor;" "Henricus Cæsar presens templum reparavit;" and the last, "Ducitur ad cœlum Cæsar mediante Cathino." But he seems to have a narrow escape. The king's head just comes above the scale in which his soul is being weighed, and the saint puts a chalice into the scale to make up the right weight. Was the splendid chalice and paten in the same case the last straw that made it all right, or has it a more religious meaning? In other words, does the chalice express the munificence of the king to the Church, or is it the offering of the blood of Christ? In either case it is an unusual treatment. The colours and quality of the translucent enamel with which this piece is ornamented are admirable, and in perfect preservation. But, as a specimen of chiselled work, delicately chased, and filled in with this description of enamel, we have seldom seen anything so faultless as Baron A. Rothschild's circular plaque, mounted apparently as a morse. The subject is the Annunciation, exquisitely finished, the colours of the enamel—especially the red and green—being as rich as precious stones. The rim is of richly-gilt, pierced, and filagree foliation. The chalice mentioned above is a most important work—parcel-gilt—of the thirteenth century, ornamented with subjects in niello—the Twelve Apostles, Abel, Melchisedek, &c. It is of very large size, and has silver-gilt reeds still in it. In the Papal mass the Pope receives the consecrated wine through a golden reed. No words can give an adequate idea of two pairs of consecration crosses of the twelfth or thirteenth century. The finest pair are in the fifth room; but both are evidently by the same hands, and of that exceptionally fine work in all respects which we now and then see in particular, almost unique examples, which make one wonder what has become of the rest—such works, for instance, as the Tennison "Psalter," and the Webb ivory consular plaque at South Kensington. The plan is as follows:—In the centre is a beautiful boss, from which are drawn five concentric rings, alternately gilt brass, set with extraordinarily elaborate cloisonnée enamel and silver, chased so finely as to require a glass to see all the beauty of the work, separated by gilt bead-work, so that in every other band there is gilt metal foliated ornament, pierced, chiselled, and chased, alternating radially with these charming enamels. The other pair, belonging to M. Sellieur, are not so elaborate in design, their chief feature being the cross which runs through the centre, giving more scope for bolder carving in the gilt metal. The terminations of the crosses are surprisingly beautiful. Of course there are many fine examples of 12th and 13th-century champlevé enamels, especially croziers and chasses. One of the best is covered with subjects representing the legend of St. Valerius and St. Martial, the

ground being engraved and gilt, and the dresses filled in with enamel. A pair of pricket candlesticks are curious as having the arms of England enamelled on their base. Some of the many splendid reliquaries are ornamented with antique cameos and intaglios. One in the shape of an ecclesiastic holding a book, among other ancient stones, has a wonderful carving in very rare red jasper of our Saviour, a most interesting and important work. There are several charming naviculæ or incense-holders, some of 13th and 14th-century champlevé enamel, and a magnificent and very costly one in the 7th room belongs to M. Ad. Rothschild, whose case in the centre of the room contains some of the choicest things shown in the Trocadéro. It is a 15th-century work, the boat formed of fine lapis lazuli, mounted in enamelled gold, the whole being richly jewelled. On the opposite side of the case there is a delightful silver triptych, with lovely engraved subjects covered with translucent enamel, and to the right of it a niello on silver, which probably was intended to be mounted in a "pax," engraved by the celebrated Nicoletto de Modena, who flourished at the beginning of the 16th century. From these few typical specimens we have described our readers will gather some idea of the wealth of mediæval art collected in this building. It is much to be desired that if a catalogue is not to be thought of now, photographs of some of the most important pieces should be taken and sold, as the South Kensington authorities have done in all recent fine-art exhibitions.

REBUILDING AND RENOVATION.

LONDON is gradually undergoing the process of reconstruction. The new streets that have been projected have transformed several localities which have hitherto remained in obscurity. New frontages have become necessary, and trade rivalry has also been active in promoting improvements and the re-construction of buildings. The two processes are just now being carried on in some parts of London with great vigour. Cheapside, Fleet-street, and the Strand, are slowly submitting to a process of remodelling that claims a share of attention, both from the public and the architect. To note the vicissitudes of fashion in style, to watch the new modes of construction and decorative treatment that are employed, is a study of extreme interest to the architect who caters for a practice in the commercial branch of his art. One of the most backward thoroughfares in London is the Strand. From Charing-cross to old Temple Bar little has been done for, at least, half a century—little since the Brothers Adam built the Adelphi, and that little has been due to improvements such as the formation of new or wider streets to the Embankment. To this cause we owe the fresh start made at the corner of Northumberland-avenue by the building of the Grand Hotel now in progress. A few paces higher the improvement effected by the opening up of the thoroughfare at the side of Savoy Chapel has been the means of the demolition of several blocks of dilapidated houses, and the rebuilding in their site of two important blocks. Thus, at the corner of Savoy-street, Messrs. Sheffield and Prebble, builders, of Poplar, are building a large white brick and stone structure for Rees and Co.—a position to be let as shops and offices. Though not startling in its external architecture it betrays a desire on the part of its builder to improve upon the vernacular of the Strand. The windows are grouped, have circular heads, and those on the return side have pilaster dressings in brick and stone. The canted angles have circular stone oriels corbelled out from the face, that give a pleasing variety to the elevations, and the designers, in this instance, have been contented to rely upon the recessed jambs and brick dressings of the window bays for relief. Messrs. A. and C. Harston, of Leadenhall-street, we believe, are the architects. Adjoining is another new building from the designs of Prof. E. M. Barry, R.A., for the new premises of the Art Union of London. The style is of a very different kind, and, from the portion already built, we should say it will be a more classic treatment of the Italian. The front divided into three bays will have deep console windows below, and above a block cornice—a segment pediment and carved tympanum emphasising the centre entrance. Three semi-circular windows with centre columns occupy the first floor, and the façade will be crowned with a deep cornice, with consoles and an attic. The whole of the front and return will be executed in Portland stone, and a solidity of character is apparent in the detail. It will be premature to judge of the proportions or general success of either of these works till they are more finished; suffice it to say they represent a noticeable change in the architectural appearance of the Strand. Messrs. Perry and Co. are the contractors.

There is another large field of activity which may be described under the name of renovation. In this manner the Gaiety Restaurant has of late undergone a complete metamorphosis. The old dingy brick structure at the corner of Catherine-street, with its curious incongruity of arches and carving, hidden for months past within a labyrinth of timber beams and shores, has been transformed, in the lower part at least, into quite a new building. The wide ugly-looking arches that occupied the ground story, and the piers and shop-front have been completely taken out, and the upper bays of openings have been brought down by the interposition of new piers which carry square heads of stone, moulded below, and constructed as flat skew-cut arches. These have the appearance of being stilted by the introduction of short angle shafts in the upper portion of the brick piers. We need hardly say the change is a great improvement upon the grotesque and singular incongruity of the old building. A further change and freshness has been imparted by the rubbing down of the brickwork and stone, and the colouring of the red brick and black string-courses and cornice, and the stranger might almost fancy that Messrs. Spiers and Pond had completely turned the old restaurant into a new building. On the ground-floor a magnificent restaurant has been formed, lighted mainly along Catherine-street. The mezzanine arrangements of the old building have been removed, and a panelled ceiling enriched in geometrical compartments now covers this portion. Around the walls painted-tile subjects in panels are being put as a frieze, and these are being filled with allegorical representations of labour and life. It is to early to judge of the combined effect till the work in this part is more advanced. Mr. Verity, the architect of the Criterion, is engaged, and there are some features—the ornamental dark wood framed lights in the openings, for instance—that reminds us of the Piccadilly building. Ample light and ventilation—a very important consideration in a refreshment bar—will be insured by this treatment, and the woodwork of a rich grain and polish, and remarkably like walnut at a distance, is being carried out with great care by the builders, Messrs. G. Smith and Co. The entrance to the Gaiety is also undergoing alteration, and its front has been completely re-decorated; the yellow stock has been coloured and pointed, the bands of red and black brick have been retouched, and the arches of the same colours have been brought out in a manner its original architect would have envied. The old building, designed by Mr. Bassett Keeling, in a style which some people called "Gothic gone mad," created no little sensation in its day by its extravagant burlesque of Italian Gothic features.

These fronts were well-nigh black with soot before they were taken in hand, and we may inquire fairly whether the art of renovation—the cleaning and touching-up of our soot-begrimed city buildings—is a legitimate one? We must confess that a little cleaning, rubbing, and colour wonderfully enhance the fronts of our sombre edifices, though we should hesitate to apply the same beautifying process to the grimy old front of Somerset House. The fact is, rubbing down our stone buildings, and repainting our fronts, must be regarded as a perennial thing if we are to tolerate it at all; but, unfortunately, the first-named process has been found a destructive one—removing as it does the coating of lichen that has been formed on the stone, while the second plan of repainting seems to be the only feasible means we possess of refreshening the exterior or lighting-up a dark street. If we could build our façades with glazed materials, face them with stoneware, or coloured tiles, much of the deposit of smoke and dust might be avoided, but the glare would be intolerable, and the only alternative open to us seems to be to find some chemical agent that could be applied to our buildings to remove the incrustation; unless, indeed, there is something in Prof. Paley's remarks, recently referred to in "Our Office Table."

THE NATIONAL ART SCHOOLS COMPETITION.

REFERRING to the collection of drawings in the galleries adjoining the Horticultural Society's grounds at Kensington, we have already remarked upon the general characteristics of this year's collection. We spoke chiefly of the oil and water-colour groups, the architectural and decorative designs, those for fictile, textile, and metal work. Generally, in the last-named departments of study, a decided improvement is observed; the harmonies of colour in the carpets and wall decorations are better than usual, and the Japanese style has largely influenced some of the designs. One or two branches of study, however, we notice are quite neglected, and it would be well if the Department and art schools throughout the country paid a little more attention to them. We refer more especially to woodwork and terra cotta design. There is absolutely nothing in the way of furniture, though for what cause we cannot say, unless it be that furniture is considered too high a standard. There is more reason to believe that it is not encouraged in our schools, that masters regard it as too technical and uninteresting a subject to invite students. But it would be wrong to allow this objection. The museums throughout the country, aided by the collection at Kensington, can readily furnish models to all schools. Take the Bethnal-green collection for example—could there be found a better selection of models for drawing than there is there? Another reason, probably, why furniture is not more studied is, that it involves a knowledge of perspective, light, and shadow, and geometrical drawing, and so long as the student can copy carpets, damasks, and other textiles, wall papers, and decoration in the "flat," he does not care to study design from the "round." But we consider that if our art schools are to be efficient, the instruction should promote design and drawing of the latter kind as well, because it becomes the basis of projection light, and shade—two of the most important branches of technical art. The French

already excel us in drawing and design from the "round," and Haydon, one of the earliest art teachers of the present generation, alleged this as the reason why the French workman surpassed our own. It is to be regretted that the drawing of solids and models is not made the basis of after studies; instead, the student is taught first to copy outline and ornament on the "flat" before he is allowed to practise his hand at drawing from the solid. There is a rather strong tendency, we fear, from what we observed at the collection, to make superficial ornament predominant. Another branch of art design that does not appear to be taken up so well as it deserves is architectural ornament; we mean the art-application of materials like iron, terra cotta, and plaster. The wrought and cast iron work we noticed was particularly scanty, and only one drawing fairly won a prize. The designs for ceiling decoration we have mentioned show room for improvement, and we are surprised to see so few designs for terra cotta decoration. Design applied to wood, iron, plaster, and terra cotta appear to us to claim a much higher place in the Departmental teaching than it has yet reached, or before it can be affirmed the Government art schools are realising the expectations formed of them as the instructors of our future art workmen.

We have yet to say a word about the drawings from the antique. We may at once endorse the remarks of Mr. Poynter, R.A., who, in his report upon the local examinations, refers to the "extraordinary inferiority of the antique drawings." Our notes upon the drawings of the antique, the torsos, heads, and figures, show a general want of idea in proportion and drawing. The limbs in some cases are too long and awkwardly united; the outlines show in others ignorance of conventional canons—a lack of correctness in symmetry of parts and balance of features—while the light and shade of many indicate no knowledge whatever of the gradations perceivable in the round. This inferiority is to be attributed to the course of study adopted, and the want of model drawing. The French student learns geometry, and to model the human figure first, and he acquires therefrom such a thorough knowledge of the latter that he can turn a fair drawing out, as Mr. Poynter says, in from 12 to 16 hours. The drawings of "The Laocöon," "The Gladiator," "The Two Discoboli," and other antique subjects, are as variously rendered as the intuitive perceptions of the students permitted. It is worth notice, however, that the ladies in this class of drawing come off as successfully as they do in the oil and other studies. Miss Dora Bradley, of Dublin, wins the gold medal for a drawing of a head from life—a very meritorious work; while of the drawings from the antique, Mary K. Benson, a Bloomsbury student, takes the gold medal and scholarship. In the modelling from the antique no student has taken a gold medal, and only a bronze is awarded, while in the modelling from life the attempts are below par, and exhibit almost a grotesque rendering of the canons of proportions of the figure. Notwithstanding these deficiencies, however, the total number of students in art schools amount to about 30,000. We understand that last year, out of 138,199 works sent up, only 790 were considered of sufficient merit to be placed in competition.

ARCHITECTURAL ASSOCIATION IN YORKSHIRE.—III.

HAVING followed the Architectural Association party at Hull for four days out of the six devoted to excursions from Hull, those of the fifth and concluding days have yet briefly to be noted. On Friday the border line of York was passed, the day being devoted to a few places of interest in the north-east corner of Lincolnshire, and these included Barton-on-the-Humber, Thornton Curtis, and Thornton Abbey. Leaving Hull by the 9.30 boat, viâ New Holland, Barton-on-the-Humber was reached rather before 11. Little worthy of record was seen on the journey, which, beyond the passage across the Humber, was of the most uninteresting character. The lack of interest in the journey was amply compensated for, however, by what was seen throughout the day — Barton alone, with its two notable churches, being well worthy of the visit. These are situated within two or three hundred yards of each other, and group in an exceedingly picturesque manner. While viewing St. Mary's from the west of St. Peter's a most charming subject for a water-colour sketch is obtained, having a green pool to the front, with some of the old red-brick houses of the village on either side of the picture, in the centre of which the east end of St. Mary's is completed by its fine western tower. St. Peter's was at once visited on arriving at Barton, where the excursionists were received by the clergy of the place. The tower is, of course, known to every student of English architecture as one of the few remaining examples of Saxon masonry. It is the earliest part of the church, and is of four unequal stages in height—the upper one being a Norman addition, the well-defined long and short work of the lower stages being wanting, while a different material has been used. The north and south sides of the tower are similar, but with this difference—that on the north is a pointed doorway, and on the south a round-headed one. The west belfry window is a 14th-century addition. The curious treatment of the masonry in the decorative arcade in the exterior of the tower walls certainly suggests the truth of the old theory of Rickman and other writers, that the work was executed by carpenters, or men little used to work in stone. The church has been restored by Mr. Cuthbert Brodrick, architect, of Leeds, and the external walls, which are of rubble masonry, have been very sensibly finished in rough cast, and not altogether without pleasing effect. The building as at present consists of a nave, with north and south aisles, chancel, western tower, and the original Saxon nave west of this, with porch on the south side, and sacristy to the north of the chancel. Mr. Fowler described the tower in a detailed manner, and stated that, in his opinion, the original church consisted of the tower as the main portion, with the small building now to the west as the nave, already spoken of as such, and finishing immediately to the east of the tower with a small apsidal chancel, now, of course, no longer remaining. We do not know if the idea is a new one, but certainly, from what we have been able to gather, no other theory seems feasible. It is certain that the tower was originally a central feature, seeing that the angles are outside the nave of the church, while the arched openings east and west in the tower are of two orders, with a pilaster on each side; but the outer faces are much more simply treated with plain arches. The windows of the western limb, called the nave, have windows placed very high in the walls, evidently for protection. Mr. Fowler supposes the building to have retained the form here described of nave, tower, and apse, until the 13th century, to which period the south arcade and some other parts of the church belong. The walls of the tower are only 2ft. 9in. thick, and the ornamental stonework is confined to the north and south sides. The tower is 18ft. square, and contains a peal of six bells. The present nave was originally of five bays, but the eastern ones have been reduced, the remains of which may be seen in the walls of the chancel. The buttresses remain on the outside. The arches are of two orders, chamfered. The north arcade is of Early English work, rebuilt with the three eastern pillars, the responds, and easternmost arch of 14th century date, which is the period assigned to the north aisle, where richly traceried windows, with alternately square and pointed heads, are used, all of the same height, which is unusual. The east window of this aisle is an interesting specimen of curvilinear date, having the remains of a crucifix carved upon the central light internally. A piscina and statue corbel also remain, so that evidently the east-end of the north aisle, like that of the south, was formerly used as a chapel. The chancel is of late 14th century, with good square-headed windows at the sides of considerable height and dignity. The east window is not original, and is poor in character. Originally there was a parvise over the south porch, and the outer and inner doorways are good examples, and, curious to remark, are almost if not perhaps exactly alike. The clerestory is of Perpendicular date of the same style as the east window to the south aisle, forming a very pretty feature to the church, and affording by its light treatment a strong contrast to the massive character of the old Saxon tower. Another contrast is to be observed throughout this district between the church towers, which are usually square or massive in outline, and the tall poplar trees with which the scenery abounds, reminding one in passing of the harmony which is seldom absent when nature and true art are found. Barton, no doubt, was at one time a flourishing town, though little if anything of interest remains in the village now beyond the two churches. We have now hastily to describe the second of these—viz., St. Mary's—which is about to be restored by the leader of the late excursion party, Mr. James Fowler, architect, of Louth. The earliest portion of this church is Norman in character, and consists of the arcade of the north aisle which has arches of Early Transitional work, about 1145, ornamented on the side next the nave, but square next the aisle, with well-moulded ribs. The south arcade is of four bays, large and lofty. The arches are of two chamfered orders, resting on octagonal pillars, with a column on each face, and a stone bench round the bases forming a seat. The caps have the peculiar small volute carving typical of early work. The shafts are banded, and the responds are simply corbelled. Externally the tower is a very fine feature, and right sorry we are not to have been able on account of time to finish our sketch of it. The detail is unusually good, especially the base mouldings and the doorway, of four orders of mouldings on the west side. The parapet is of late 14th century date, and peculiar rather in arrangement. The east face is nearly plain. The sprawling squat outline of the south porch, a good specimen of lancet work, greatly adds to the height and dignity of the tower as seen from the south south-east, which is architecturally the best view. The chancel is of Geometrical character, with an east window of five lights. The overhanging feature under the crowning gablets of the buttresses is worthy of note. The most noticeable feature in the church is the arcade on the south side of the chancel, dating about 1315, with its peculiar seat between the piers. The clerestory of the church is very similar in character to that of St. Peter's, and is thought to have been built at the same time. Leaving Barton by coaches an almost flying visit was paid to the parish church of Thornton Curtis, where sketches were made of the beautiful porch on the south side, with its equally interesting wrought-iron work on the original door within, the whole being a good example of 13th century workmanship. The nave arcade of about the same date is also a fine example, with particularly good foliage to the caps. The western pier of the north arcade is worthy of special remark. The font has some curious though rude sculptures upon its square-sided bowl, and the clever manner in which the weatherings to the buttresses of the fine tower at the west end are managed is worth more than a passing thought. Few details of modern churches fail more than their buttresses. Thornton Abbey gateway was next visited, where, before inspecting the remains, two important duties had to be performed, for here it was that the party arranged themselves as a study for the photographer previous to adjourning for lunch. Before, however, the repast was concluded shelter had to be obtained within the gateway on account of the rain, which now descended in almost tropical fashion, considerably interfering with the operations of sketching during the afternoon. This gateway is at once one of the most splendid examples of monastic architecture remaining in this country, and certainly it was about the only specimen of Domestic work of any particular interest seen by the excursionists throughout the week, for notwithstanding the

richness of the district selected for examples of ecclesiastical work, scarcely any old houses were seen beyond a few bits in the slums of Hull. This gateway was illustrated in the Building News for July 19th last, from the R.I.B.A. prize medal drawings of Mr. B. Priestly Shiers, who then gave a detailed description of the structure, leaving little for us to say beyond briefly following Mr. Fowler in his description of the abbey itself, of which scarcely anything remains beyond a beautiful fragment of the chapter-house, which itself must have been a fine building. The abbey was founded by William Earl of Albemarle in 1139. The church was of considerable size, being 282ft. long within the walls east and west, 62ft. across the nave and aisles, and 128ft. across the transepts—the tower at the crossing being about 34ft. square with a nave 8 bays in length, the choir and Lady chapel being of 7 bays. From the remains the piers seem to have been clustered shafts, and of not earlier date than the latter half of the 13th century, the chapter-house dating about 1280, and the church would be somewhat earlier. The cloisters occupied only a portion of the south side of the nave, about 100ft. in length. In a chapel east of the south transept, some good Early Decorated work is to be seen. A large room to the north of the choir remains in its foundations, which show it to have been about 30ft. long by 15ft. wide. The building was so long used as the stone quarry of the neighbourhood that the wonder is that anything is left. Happily it is now well cared for, and it is greatly to be hoped that what remains will for many years be preserved from further loss and spoliation. The west doorway appears to have been a grand entrance, 10ft. wide, divided into two parts, and there was a doorway from the Lady Chapel at the east end—a very unusual arrangement. The use is very doubtful of the long-groined chamber at the south side of the transept. It is long and narrow, three-and-a-half bays in length, and with ten arches on each side, and two at the end, opposite the doorway. There is no means of obtaining light beyond that coming in by the doorway to the cloisters. Adjoining this is the passage way to the chapter-house, an octagonal building, about 42ft. diameter originally. The lower part was richly arcaded, and the sides are about 18ft. in length. At each of the external angles was a large projecting buttress. The work of the south transept corresponds with the chapter-house, and was, no doubt, a work of the same period. The exceeding beauty of this abbey is the source of many a regret that so little remains of its splendour, but when we look at the fine gateway still existing, and above alluded to, we gain some idea, at least, of the magnificent character of the entire work, although the gateway itself is of much later date than the abbey, being erected about 1382. In spite of the rain, which cleared away rather before the party left, some good and telling sketches were made, and a fine view of the old gateway was obtained as the sun burst forth from the west as the excursionists left the Abbey of St. Mary, at Thornton (derived from the Northern deity, Thor), by train for Hull at half-past five. The final dinner took place in the evening, when thanks and hearty toasts went round, with good wishes to those whose labours had done so much to secure the success of the excursion, and here we must name not only Mr. Fowler, who conducted the party, and Mr. R. C. Pink, the able excursion secretary, but also the president, Mr. H. L. Florence, who so greatly added to the pleasure of the gathering, which included, besides the English members, no less than five from Ireland, one from Scotland, and one from Wales—certainly, at any rate, a representative meeting. Bath, Bristol, and Wells were spoken of as the district for next year's excursion. On Saturday visits were made to the Churches of Holy Trinity and St. Mary's, at Hull. Holy Trinity is one of the largest parish churches in England, cruciform on plan, with a fine central tower. The church is 272ft. in length internally by a width of 72ft. in the nave and aisles, and 96ft. across the transepts. The earliest parts of the church are the lower stage of the tower, the choir, and transepts up to the aisles of the nave. The north aisle of the choir is much lower than the others, but seems to have been the height of the whole originally, as the opposite sides show signs of having been raised. The choir is 100ft. long by 70ft. broad, and is of five bays, with broad lofty aisles, with a series of small rooms used as vestries on the south side. The windows are Flamboyant in character, and the external walls faced with brick, said to be one of the earliest examples of brickwork in the kingdom. The nave, and all west of the tower, is of Perpendicular work of the early part of the 15th century. The arcade is of eight bays of lofty and acutely-pointed arches, resting on thin clustered shafts. The clerestory has two three-light windows to each bay. The west window is of five lights. Curious to remark, the tower has settled into the ground at least 2ft. without disturbing the abutting walls to any extent, so that the bases of the piers are quite covered up, while those of the responds remain above ground. The church has been restored by the late Sir Gilbert Scott, but we cannot but think the screen wall at rear of the altar quite unequal to so important a church. The new stalls, however, are good in the choir. The restoration of the Tower is in progress. St. Mary's church is a much later building than its sister church, though, doubtless, some portions are by the same hands. It consisted originally of nave, with north and south aisles, and a western tower; but an additional south aisle has been added by Sir Gilbert Scott to obtain more accommodation. The curious faults of design in the original arcade have been reproduced in building the south aisle, which is to be regretted. The church is well cared for, and some good glass is in some of the windows. The east window is of seven lights. The font is a very ugly specimen of modern illuminated decoration. The western tower extends over the street paved way which passes through lofty pointed arches in the ground story of the tower, but these are modern, having been inserted when the roadway was widened. Of the old domestic buildings and new erections in Hull, space will prevent our saying much. Of the former, with regret be it said, little remains. The history of Hull is but a brief chapter, although it extends back a long way towards the Conquest. In the twelfth century it had a considerable trade, and Edward I. (1272-1307) seeing its natural advantages, purchased it for the Abbot of Melsa, in Holderness, gave it a charter, and called it King's Town-upon-Hull. Fortified by Edward II., it was of much importance in the following reign, sending sixteen ships to the siege of Calais. The old buildings may now be counted almost on the fingers, and we took some trouble to search them out. Taking them roughly, we have, after the churches already named, the now tumble-down old Grammar School near Holy Trinity, of 1583 date, with its brick mullioned windows and transoms. This is shortly to be pulled down. The half-timbered old inn in High-street, formerly called the King's Head, is now a marine store, but is very suggestive with its overhanging upper stories and central projecting bay. Bryant's Court, not far off, has a good carved beam. The White Hart, up Bow Vale Alley, has some good panellings and fireplace, as will be seen by our illustration given in the Building News, May 28, 1875. The Wilberforce buildings are not a bad example of seventeenth century brickwork, but there seems little of interest beyond the front. Charles I. was entertained in this building during the civil wars in 1639. Undoubtedly the most interesting remains of old brickwork in Hull have passed away; for instance there was the old house we illustrated in the Building News for Feb. 19, 1875. It was situated in Dagger-lane, anciently called Champagne-street, but it has lately been plastered over and otherwise destroyed. We will not attempt to go through the buildings of modern Hull, but merely name the Town Hall, by Mr. Cuthbert Brodrick, as by no means one of his best works, and like the New Dock Offices, by Mr. Wray, it is by far too florid any way for so grimy a town as Hull. The post-offic, with its notable and projecting headed doorway, by Mr. Williams, is better, but the red brick Queen Anne front over the way is very coarse and poor. Perhaps the best new building in Hull which we saw is the church in stock brick, with a very good tower and spire also in brick, not far from the station. It is certainly a well-proportioned work, notwithstanding the weak eaves to the apse, and rather humpy plate tracery. We were told that Messrs. Adams and Kelly, of Leeds, were the architects. We have no room for general remarks, but if there is one thing that will last in one's memory beyond the impression obtained from seeing, if not for the first time, such splendid examples of Gothic architecture as were gone through by the Architectural Association during their excursions in the south-east corner of Yorkshire, it is the generally dirty condition in which the churches are for the most part allowed to remain. Those on the south of the Humber were much better, but excepting these and one or two more, we cannot but think there is room for considerable improvement. M. B. A.

THE PARIS INTERNATIONAL SANITARY CONGRESS ON UNHEALTHY INDUSTRIES.

Although English Sanitary Science was not so fully represented at the International Hygienic Congress, which has just been held in Paris, as it might have been, several good papers were read on subjects of practical importance. Dr. Phipson, Professor Lutschauning, and other speakers dwelt at length on the virtues of the silex employed by the Silicate Paint Company of Liverpool, and on "Griffiths' Patent White," as a substitute for white lead. This latter supplied the material for a very interesting paper, written in answer, and called forth by Professor Gubler and Dr. Napia's report on unwholesome industries. These gentlemen had pointed out that, out of the number of dangerous industries they had investigated, those where lead was employed were more frequently brought under notice, and of the workers in lead the paint-makers and the house-decorators supplied about two-thirds of the victims who suffer from the poison. Such a crying evil imperatively demands immediate remedy, and yet the authors of the report are not very hopeful in their tone. They point out that the masks made to prevent the workmen inhaling the particles of lead-dust have fallen into desuetude. The workmen neglect to put them on, they also refuse to avail themselves of the baths erected for their benefit, and will not drink the antidotes prescribed. Thus the poison is allowed to take its course unchecked; nor have the attempts to substitute zinc paint been very successful up to within the last few years. The authors of the report, therefore, concluded by inviting inventors from all countries to suggest some practical remedies. In reply, Professor Lutschauning urged that "Griffiths' Zinc White" was not made of oxide of zinc, which is much dearer than lead, but consists of another combination, which is as cheap as the poisonous paint, has about 25 per cent. more body or covering power, lasts much better, does not yield to the influence of heat or gas, or even sulphuretted hydrogen, and does not produce any galvanic action on metals. This new paint does not give any unpleasant odour, is in no wise poisonous; its whiteness is of the purest quality, and it therefore possesses every necessary virtue to establish its marketable value, while it offers a wholesome substitute for the dangerous bad paints that have caused so much mischief.

We notice that a paper has been read on the same subject by Dr. Phipson before the chemical section of the British Association at Dublin. The new "Zinc White," it may be as well to mention, is totally distinct from the other paints prepared by the Silicate Paint Company, but it seems likely to share the good reputation they have earned.

The framework of a new reredos in English oak, from the designs of Mr. George Edmund Street, R.A., has lately been placed in York Minster, at the expense of the dean. The whole work partakes somewhat of the nature of a triptych. When completed there will nine groups enclosed in as many panels. The central one alone is in progress at Messrs. Doulton's establishment. It consists of one panel about 9ft. in length, the base of which will be at the height of 8ft. from the footpiece. It depicts the scene upon Mount Calvary at the third hour.

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OUR LITHOGRAPHIC ILLUSTRATIONS.

ALL SAINTS' MEMORIAL CROSS, CAMBRIDGE.

The cross, an illustration of which appears in our present number, is one which it is proposed to erect in the old churchyard of All Saints, Cambridge. The old church was an unsightly building, with a brick chancel of the early part of the last century, and was taken down in 1865, a new church having previously been built on a site given by the Master and Fellows of Jesus College, from designs by G. F. Bodley. Since the demolition of the old church, time has done much to obliterate the names on the tombstones—in most cases the inscriptions are most illegible—and it has been felt that the time has come for the erection of a monument, at once to mark the site of the old church, and to record the names of some of the more noteworthy of those who rest within the sacred enclosure. The site on which the cross is to be erected is one of considerable dignity. Its shape is pretty nearly triangular. On the south side are Trinity and St. John's Colleges, on the other two sides the new divinity schools now in course of erection, and the new buildings of Trinity College. Our view is taken from the south side, at a point about midway between the gateway of Trinity and the east end of the chapel. The divinity schools are seen behind the cross, on the spectator's left hand.

SECOND PREMIATED DESIGN FOR YARMOUTH TOWN HALL.

This week we give plans and perspective view of the second premiated design for the above building, by Mr. G. Nattress, architect, in conjunction with Mr. G. Ledger. As will be seen the authors have adopted a Renaissance style, handled with some degree of picturesqueness. On the merits of the design as a whole we have already commented; we leave the plans, which show the detail of the arrangement, to speak for themselves. We shall, in due course, give the first and third premiated designs, as well as one or two of the more prominent unpremiated designs.

HADDON HALL—SKETCHES OF LEADWORK.

These cistern heads and down pipes are in almost perfect preservation. They are ornamented by hand-cut piercings and cast heads and bosses. In the large cistern heads there is a false front, so that the piercings show sharp against the shade; on the bands they are backed up by the rain-water pipe. There are other varieties not illustrated. — W. R. Lethaby.

HOUSE AT WOBURN PARK, SURREY.

The illustration is taken from a drawing in this year's Academy. The house is now being erected on a fine well-timbered site on high ground, commanding extensive views over the Valley of the Thames. The walls on ground story are of red brick, with tile hanging and half-timber framing above—the roof is tiled with Cooper's ridging and terminals. The plan is somewhat peculiar, having a large hall with chimney corner, &c., while there are only two reception rooms, the hall being intended to partly take the place of a third, until the house is extended by the addition, at some future time, of a large drawing-room on the western side. The work is being carried out by Messrs. Knight and Sons, builders, of Chertsey. The architect is Mr. Theophilus Allen, of Adelphi Chambers.

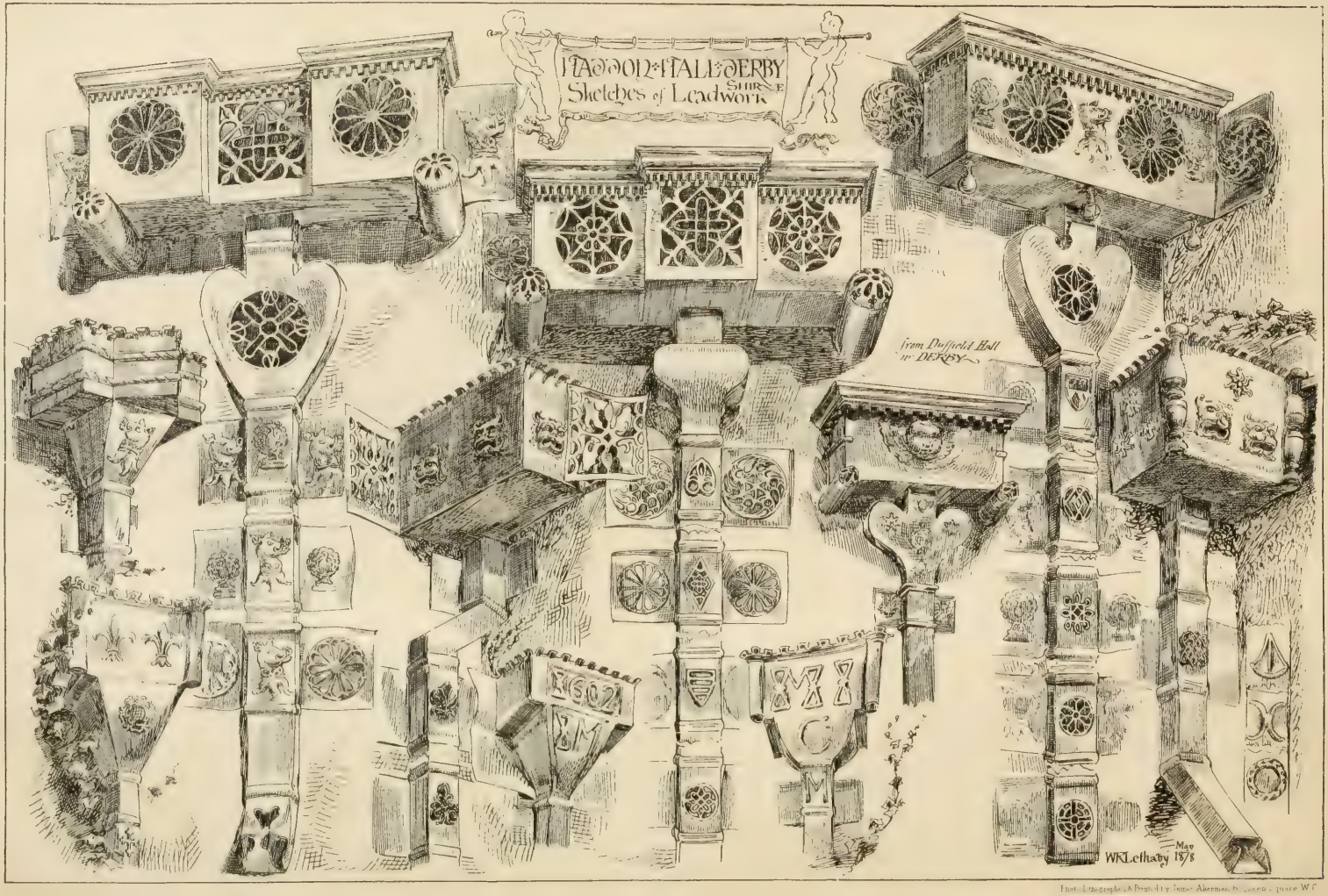
OLD ST. PAUL'S.

In our report of the proceedings of the late Architectural Conference, we mentioned a recent discovery brought before the attention of the members during their visit to St. Paul's, by Mr. Penrose. In the excavations made in the churchyard for a gas-meter in the south-western angle between the nave and transept some masonry was hit upon which has since been found to be portions of the chapter-house and cloisters of Old St. Paul's. Mr. Penrose, with indefatigable energy, ordered further excavations to be made at certain points in the enclosed ground, and the result has been that the outer line of the cloisters on the south side, with a portion of the inner arcade or screen and two or three buttresses of the chapter-house, have been brought to light. Of course, the chroniclers of passing events have done their best to present the discovery of these relics in the most attractive colours, for a long article has appeared in one of our contemporaries, from which it may be inferred the discovery has only just been made. From a careful examination of the remains and an outline plan made by Mr. Penrose, it is not difficult to trace the exact position of the old chapter-house, and consequently the position of the old cathedral, the axis of which does not coincide with that of the present structure, as is well known. It is evident from the excavated fragments of the outer wall and the inner range of pillars whose bases have been found, that the old cathedral ran in a different direction from the present one, and that the lines of the old nave were considerably more northward at the west end. Dugdale, in his plan of the old church, shows the original chapter-house and cloisters, since engraved by Longman in his "Three Cathedrals," and the present discoveries bear out the octagon plan, though it is found that the chapter-house, as shown by Dugdale, is considerably less in diameter than the discovered buttresses indicate. According to the position of their bases, the octagon must have been nearly 60ft. in diameter. Again, there is reason for believing the axis of the old building differs from that shown in Dugdale. We should like to see a carefully-calculated plan laid down from the present fragments, for the purpose of setting at rest the speculations of archæologists. The form and size of the chapter-house can now be determined to a nicety, and of course the position of the transept and nave walls follow. The most interesting fragment is the foundation of a wall that is unmistakeably the inner screen wall of the cloister on its eastern side. The bases of the shafts and the moulded portions of the shafts themselves of Purbeck, and the ribs and bosses of Caen, are very sharp and fresh in appearance, and show a late style of Gothic. A portion of the cloister paving has been also found, the tiles being set diagonally at a level of about 4ft. to 5ft. below the surface of ground. The discoveries corroborate generally the plan given by Dugdale; the proportion and size of the cloister garth, and the octagonal chapter-house that occupied its centre, are now placed beyond a doubt, and a conjectural restoration of the precincts of the old building is more possible now than when Messrs. Longman's "Three Cathedrals" was published. Close to where the present excavations are made several beautiful chapels attached to the old church were situated, and the bishop's palace is said to have stood on the north-western part of the churchyard. Agreeably to the recent Act, which enables the Corporation to acquire and hold vacant spaces, the dean and chapter have sanctioned the lowering of the present railing—a very fine sample of Queen Anne ironwork—the formation of a footway, and the laying out of the enclosure as a garden, but a question will arise how the excavated fragments are to be dealt with. *Apropos* of improvements at St. Paul's, we may mention that three or four of the 12 new bells presented to the cathedral have been fixed in the north-west tower. They are fine castings—each bell bears on one side the emblematic device of the cathedral, and on the reverse the arms and motto of the company presenting it. Altogether the 12 bells weigh, we hear, about 11 tons. They have been cast by Messrs. Taylor and Co., of Loughborough; Messrs. Shaw, of King Edward-street, having carried out the necessary alterations for their hanging, under Mr. Penrose.

NATIONAL ASSOCIATION OF MASTER BUILDERS.

The Council of the National Association of Master Builders of Great Britain have this week issued their half-yearly report. The document is a very long one, and the following is an abstract. The report commenced by giving a list of towns the Master Builders' Associations of which had affiliated themselves with the national organisation. They were as follows:—Altrincham, Bradford Builders' and Bradford Stonemasons' Association, Birmingham, Bolton (Master Joiners' Association), Bristol, Crewe, Cambridge, Chichester, Coventry, Croydon, Dudley, Derby, Doncaster, Eccles, Central Association of Master Builders of London, Lincoln, Leicester, Liverpool, Leeds, Lancaster, Manchester and Salford, Macclesfield, Northampton, Newport (Mon.), Norwich, Nottingham, Nottingham (Master Plumbers' Association), Runcorn, Southport, St. Helens, Warrington, Wolverhampton, Wigan, and Walsall. One of the first efforts of the organisation was to collect statistical returns from various centres of industry as to the rate of wages and the number of hours worked, together with the condition of the labour market. A second return of a similar nature was made in July, and this had proved a great boon to the trade in the settlement of disputes with the operatives. A list of several towns was then given, with particulars of the operatives' demands, and the masters' action in each. The committee then continued by remarking that there were still many towns where local associations already in existence could not see their way up to the present time to affiliate themselves with the national association. The principal of them were Bath, Burslem, Chester, Cardiff, Hull, Preston, Plymouth, Portsmouth, Sheffield, Stockport, and Sunderland, but they were quite willing to give all information in their power when required by the organisation. Union was very important, and the report urged builders to do what they could to induce unattached societies to give in their allegiance. The association had been the means of forming local associations at Derby, Macclesfield, and Eccles, and there was little doubt it had tended to check the demands of the operatives throughout the kingdom. In Liverpool, where the largest strike in the building trade had occurred this year with the painters, the secretary of the Operative Painters' Alliance Society sought for a deputation to be received from the operatives to arrange terms, and put an end to the strike, and he was informed by the chairman that the men could apply for work, and as many as were wanted would be employed. In reply to this, he complained that wherever the men had applied for work in other towns they found that no Liverpool painters were taken on. The men returned to work on the following Monday morning. The National Association had recommended the local associations to petition the House of Commons, through the members of Parliament for their respective towns, against a bill to amend the law relating to the liability of employers for injuries negligently caused to persons in their employ. The treasurer presented his accounts, showing the amount of subscriptions received for the year was £228 3s. 1d. Of this £76 2s. 6d. had been expended, and £152 0s. 7d. was therefore left in the bank. When the secretary's salary and other disbursements were paid a net balance of £66 8s. 6d. would be left in hand. The plasterers' strike in Bristol still continues, the men having demanded an increase of 1d. per hour. The employers, however, are fast filling their shops at the old rate, and the strike will probably collapse in this way.

Torquay.—At Torquay, on Saturday last, the formal inauguration took place of some extensive main drainage works, by which the sewage of the town is discharged into the sea two miles from the town, without any possibility of its being washed back by currents or tides. The works, which had been carried out according to a plan of Sir Joseph Bazalgette, cost £65,000. Sir Lawrence Palk, M.P., who presided at the dinner, remarked on the advantages of the improvement in itself, and referred to the good example set by Torquay in helping itself, instead of doing what many towns did—namely, seeking the assistance of Parliament in objects practically local.



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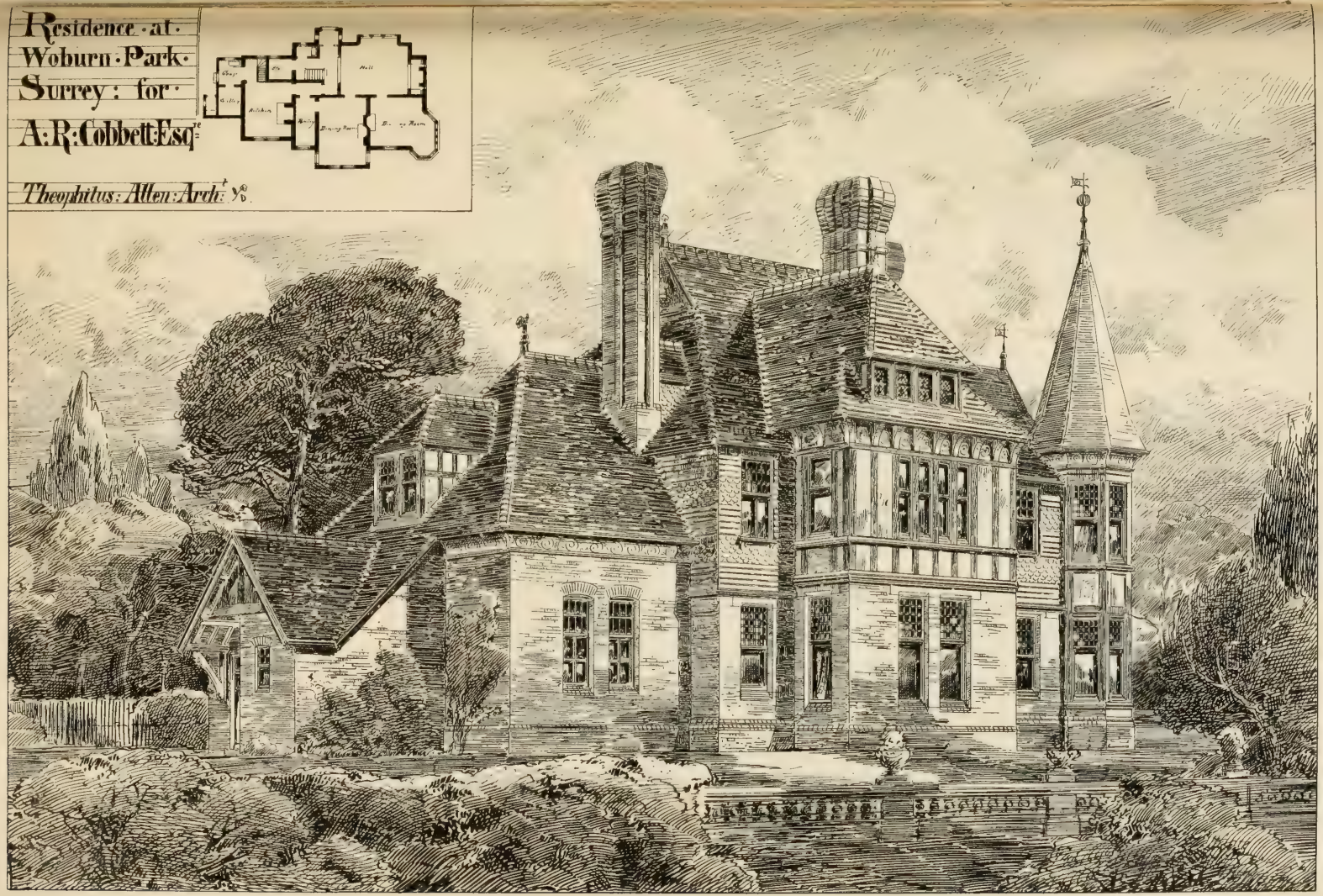

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Proposed
Memorial Cross
ALL·S·S·CHURCH·Y·
CAMBRIDGE
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ARCHITECT.

THE CONGRESS OF THE BRITISH ARCHÆOLOGICAL ASSOCIATION AT WISBECH.

[FROM OUR OWN REPORTER.]

THE Fen-country Congress of the British Archæological Association will long be remembered by those who took part in its meetings and excursions as one of unexpected interest. The buildings visited were chiefly ecclesiastical—Benedictine abbeys at Ely and Peterborough (long since elevated into cathedrals), Thorney, Crowland, Grey and White Friars' houses at Lynn and Stamford, a Cluniac establishment at Castle Acre, and spacious churches almost beyond number, gave a strongly-marked character to the meeting, which was fittingly closed by a two days' scamper—a more dignified appellation would be less correct—through the colleges of Cambridge. Of domestic architecture scarcely an example was examined, except perhaps the presidents' lodges at Cambridge—an assertion to be qualified if the concession to popularity by a trip to Sandringham be insisted upon as "archæology." It is, therefore, to be regretted that the almost unequalled Early Jacobean mansion of Burghley House and the mediæval pleasaunce of Middleton Towers had to be expunged from the programme as impracticable. The fortifications seen during the nine days' meeting were chiefly of the nature of earthworks, banks, moats, and mounds thrown up at an unknown period, vaguely regarded as Romano-British. Some of these hillocks, now planted with trees, and forming pleasant diversities of surface in the true Fen-lands, were utilised by the Normans for sites for massive castles, as at Stamford, Wisbech, Cambridge, Castle Rising, and Castle Acre, but these have with two or three notable exceptions, amongst which Castle Rising must be particularised, entirely disappeared.

The excursions extended over rather too extensive a field to be properly carried out, and one or two serious break-downs of the complicated carriage and special train arrangements are partially attributable to the attempt to crowd too much into a day. In a congress held in a district wherein the difficulty was, as was remarked at the inaugural meeting, "not what should be visited, but what could be left out," Stamford and Spalding might well have been reserved, with Burghley, for another year. Amongst the advantages of the widespread excursions of this congress may be mentioned the varied types of churches seen within an interval allowing of comparison one with another. Thus, with the square-built, well-lighted ecclesiastical buildings of the Marshland, chiefly of the 15th century, could be contrasted those of North Northants and Hunts, having narrow aisles and naves, and short broach spires, rendered more clumsy in outline by the expansions for lights, and with these the lofty-naved highly-decorated edifices across the Lincolnshire border. More than one instance of a church sadly needing restoration was seen, and it is possible the attention called to these buildings may be instrumental in averting the progress of decay. Many of the corporate towns visited are wealthy in parchments and plate, and not a few town councillors (and even heads of colleges) appeared unwillingly undeceived when the asserted dates of their silver-gilt vessels and maces were tested by examination of the hall-marks, and the fondly-cherished traditions of the antiquity of the town's treasures were shorn in a twinkling of several centuries of romance. This over-estimation of age allowed for, and correct dates assigned and borne in mind, the salvers and hannapers, swords and maces exhibited during the congress, formed a valuable series of illustrations of the silversmith's art as practised in the service of wealthy burghs during the oft-times troubled Stuart period. The charters at Wisbech, Lynn, and Stamford were especially interesting as palæographical specimens, and prepared in some measure for the priceless manuscripts jealously guarded in the college libraries of Cambridge. The papers read during the congress were of considerable interest, especially those bearing on the industry displayed in past ages to drain the Fens, and to protect the lands, thus snatched from the morasses, from fresh inundations. The architectural and historical essays were also worthy of the occasion. Some of these lectures we may reproduce in a condensed form in future issues. We gather up anew the threads of our detailed narrative at the proceedings of

THURSDAY.

The morning was devoted to the ancient borough of King's Lynn, the afternoon to a carriage drive to Sandringham, taking the Norman fortress at Castle Rising *en route*.

LYNN.

The members assembled at the *Town Hall* formerly the hall of Trinity Guild. Its handsome front of flint and freestone chequer work, broken into by mullioned four-centre windows and shallow niches, is characteristic of a fifteenth century East Anglian corporate building. The interior does not fulfil the promise given by the outside; the old timbered hall is gone, and floors and partition walls have been freely introduced. Upstairs the regalia belonging to the Mayor and Corporation were exhibited and explained by Mr. Beloe. These consist of a cup and its cover, and a sword, traditionally said to have been given the town by King John; a chain and badge of office, and four large silver-gilt maces. The most noticeable is the cup, which has been often figured and exhibited; it is of singular beauty of outline, of silver gilt, and 73oz. in weight. Upon the sides, foot, and lid are panels of dark blue enamel (champlevé), in which are incised figures of lords and ladies hawking and hunting. On base are inscriptions of various repairings by past mayors, the earliest record dating 1692. Mr. Brock having pointed out that while the cup could not be ascribed to so early a period as King John, the costumes of the figures were French in character, and of the period of Richard II. The vessel was almost unrivalled in beauty. Mr. Lambert, F.S.A., vigorously attacked the local traditions, saying that the cup might be of respectable age; it had been so cared for by the mayors of Lynn, that it resembled the Irishman's gun, which had had new lock, cock, stock, and barrel, yet was his original weapon. The cup had now neither style, art, nor taste, and mayor after mayor had, they could readily read, repaired, regilt, and renewed the vessel. The maces had the low crown of Charles II., but the scabbard seemed like the work of George Payne, of London, a noted silversmith of George II.'s reign, and the mayor's chain might be several minstrels' chains, welded together, or even part of the old weights and scales. A discussion ensued in which it was shown from the heraldic devices that the scabbard and maces were ornamented not more recently than Charles II.'s reign; the sword was pronounced to be of Henry VII.'s time, while, as to the cup, Mr. Bloxam subsequently, in St. Margaret's Church, pointed out that the costumes on the great brass of Robert Braunche and his two wives, under the south-west tower, which is dated 1374, precisely agree with those portrayed on the enamel, and he suggested that the cup might have been given by this great merchant and mayor. In the magistrates' room at the Town Hall is a piece of stained glass in a window, on which the cup is depicted very fairly as to contour. In another room the corporate records were shown, and were described by Mr. W. de Gray Birch as a very good series of charters and deeds, ranging from that signed by John, Bishop of Norwich, in the year 1200, to one granted by Philip and Mary. A peculiarity was that many of the charters were in duplicate. Their contents were well known, for they were the ordinary documents issued from the Exchequer, but the series was of great value to students of the paleography of art. He suggested that greater care ought to be taken of the seals, which had been shaken about in their cases, and were battered in consequence.

The members then made a perambulation of the town. The narrow crooked streets of Lynn Regis contain many flint and rubble four-centred archways, well-carved wooden doors, and heavily mullioned windows and other fragmentary reminiscences of the most prosperous days of the ancient port. In Queen-street a halt was made opposite a richly-carved door of the time of Edward IV., set in rather earlier archway; on the chief stile of door is the inscription—"Magister Thomæ Thoresby fund. huj. dom." (Thomas Thoresby, mayor, built this his house). The great *Church* of *St. Margaret's*, with its twin western towers and long range of aisles, was amongst the buildings visited. It was restored three years since by Sir Gilbert Scott (Mr. Bell, of Cambridge, contractor) at a cost of £11,000. The western towers are dissimilar; both are Norman at base, but that on south side is Early English, except uppermost story; the northern one is Perpendicular. The crossing of transepts greatly needs emphasis; a lantern stage was commenced by Sir Gilbert Scott, but the foundations proved insufficient. The external walls are plain to barrenness, and recall the vast churches of South Holland. On entering the church the clumsy pseudo-Gothic nave arcades strike the eye as much as the good proportions and excellent lighting; the wretched character of the nave is explained by the fact that the spire of south-west tower fell upon it in 1741, and that the crushed portion was rebuilt the following year. In the east end is a post-Reformation circular window, filled with three tiers of almost rectangular tracery; the effect is singular rather than pleasing. In the church were seen two of the largest brasses in existence, about 10ft. by 5ft. each. Mr. Brock delivered an address in the church, in which he called attention to the grotesque carving on the stalls, parcloses, and other features, and deprecated the mode in which, during the recent restoration, all the more modern fittings were swept away, instancing the excellent Carolvian panelled screen at east end, which had been removed and divided into portions placed at the end of each aisle. Again, a few generations since a chapel on the north of chancel was removed to widen the street, as a cheaper expedient than to pull down houses on the other side. The opening into this chapel had been closed with screen-work, which has also been removed. In the south aisle of chancel is a library of above 500 vols., which Mr. Birch described as containing some early printed books and good MSS. The *South Gate* of Lynn, a mouldering embattled structure of early 15th-century workmanship in brick, having been seen, the remains of the *Town Walls* were traced a short distance. They consist of low broad walls of rubble, still faced in places on the outer side with ashlar; on the inner side are a series of deep arches, with pointed heads of the period of Henry the Third, and having loopholes. The wall is defended on the outer side by a ditch. Beyond the remains of the wall are the Public Walks, in which is situated, upon an ancient tumulus, a singular octagonal edifice, known as *Red Mount Chapel*. This building is of brickwork, with stone dressings. It is three stories in height, and has a graceful porch. Two staircases in the walls, having deeply-worn handrails of cut brickwork, give access to and egress from the three chambers, 17½ft. × 14ft. each, into which it is divided. The upper one is the chapel—a gem of Late Perpendicular panelling and tracery, with fan vaulting to roof. The pierced cornice, canopied panels, and traceried windows of this little chapel are all worthy of study. The plan is a Greek cross, the eastern limb being fitted with high stone altar-table and piscina. Mr. Loftus Brock, in a brief lecture, referred to the unique character of the chapel, to the fact that it was proved by the Corporation records to have been erected in 1484 by Robert Curraunce, and mentioned the casing shell as a satisfactory example of early brickwork. In it were formerly exhibited relics, and the two staircases were devised to allow of the rapid visit, inspection, and exit of large numbers of people. The *Grey Friars Steeple* was examined on the return to the town. It is the only remaining fragment of a Franciscan monastery church. The chancel arch, supported north and south by modern buttresses, also of red brick, is groined and pierced by side niches. From the centre rise two octagonal stages of a steeple of great beauty, crowned by embattled parapet. At the north-west angle is a stair turret, rising a little above tower, and capped 90ft. from ground with ogee roof. The date is about 1300. A century ago the interior of the arch was blocked up by a cottage, and others abutted upon it. These have been removed by the Corpora-

tion, and a rockery and fountain forms a centre-point, as pleasant and refreshing in appearance as it is incongruous. The tower was again repaired and repointed last year. In describing the steeple Mr. Brock said it was worthy of attention, not only for its intrinsic beauty and grace, but because it illustrated a feature that had been destroyed in the great convent of St. Andrew's, Norwich. The nave of this church must have been of great width and extent, and this agreed with the habits of the Grey or Preaching Friars. Next was seen the quaint old *Custom-house*, which might almost be imagined, from its clumsy sashes, broad, balustraded roof, central wooden turret, ending in ogee pinnacle, to have been imported bodily—beam and brick—from Rotterdam or Utrecht, except for the statue of the Second Charles over the chief entrance. There was but time left for a flying glance at the bricked-up gable of St. George's Guildhall in King-street, now the front of a warehouse, before a hurried visit to *St. Nicholas' Chapel*, a large and pure specimen of the Norfolk type of Perpendicular—windows verging on Flamboyant, two ranges of eleven octagonal columns dividing aisles from central area (for there is no structural division into central nave and chancel except in eastern part), and a richly-panelled tie-beam and queen-post roof, with angels at springings of principals. In the eastern bay are remains of the crocketed heads of what must have been very rich sedilia; their destruction is one of the many wanton acts charged against Cromwell. The only early feature is the low 13th century tower at the S.W. angle, upon which is raised a lead-covered oak spire, from Sir Gilbert Scott's design. The fifteenth century carving in the chapel is flatly treated, and has a distinctly Flemish appearance. The south porch* is perhaps the finest example of its class—spacious, of two stories, each groined within, and faced between the shallow niches with flint and stone chequers. After luncheon the members were driven over to Sandringham, visiting *en route*.

CASTLE RISING.

Here is the finest example in the Eastern Counties of a square Norman keep. It is set, like that at Norwich, into a much earlier series of earthworks, which have been partially disturbed to form baileys. The moat is crossed by a stone bridge leading to a projecting angle of the castle, in the inner face of which is placed the entering staircase. The walls are of great thickness, and are pierced by passages on the further side from entrance. A thick wall divides the interior of the castle lengthwise into two parts, both open to the sky; in the larger division the ancient well is being fitted with standards and pipes connected with a cistern—a wretched red brick excrescence—in course of dovetailing into the old masonry. This is for the supply of the adjacent hall. The well is circular, 70ft. in depth and of small diameter; it is said to have been continuously in use. Throughout the castle the arches, jambs, and string-courses are decorated with free and late Norman carving, zigzag and billet, with some grotesque work. A discussion arose amongst those who ascended to the upper passages as to the ancient position of the oratory, Mr. Reynolds arguing that the vaulted recess on the east side was so used as in the Towers of London, Rochester, and Norwich, while others considered the evidence afforded by masonry insufficient, and that the chapel was set outside the north wall of keep.

SANDRINGHAM.

The visit to the Prince of Wales's Norfolk home afforded a pleasant, and certainly popular, break in the week's archæologising. After seeing the Prince's kennels, with substantial well-drained houses, paved yards, and high railings in front, like a menagerie, the members went through the series of stables, arranged on three sides of a quadrangle, with coach-houses in the centre. All these buildings, together with the roomy cottages and farmsteads on the estate, are of brickwork, faced with a dark ironstone raised in the neighbourhood, and known as "Carrstone." This crops out in strata of tile-like fragments, which are laid on edge, and secured by mortar at the back, so as to present a nearly black serrated surface. The effect of the contrast between this facing and the white bricks everywhere used for dressings is novel, and very satisfactory.* The members walked through the grounds, which are well laid out and admirably kept, to the lawn in front of the house, where, on bare boards supported on trestles, tea, bread and butter, and plain cake were spread. The homeliness of the Prince's hospitality was overlooked after a long day's walking and driving, and, after partaking of a rough-and-ready meal, the house itself was visited. It was refronted and almost rebuilt eight years since by the late Mr. A. Humbert, and the red brick new front, diversified by projecting bays and roofs, clumps of chimneys, and an ogee turret, is of Early Jacobean and thoroughly Domestic English character. It is set on a raised terrace. We did not notice a sash window throughout—the lighting in every part is by abundant French casements. The members were marshalled through the suite of apartments on ground floor. Although furniture and books were encased in holland wrappers, enough was apparent on the walls and elsewhere to show the purely modern taste of the Heir Apparent, and the entire absence of ostentatious display. The only attractions to the extreme archæologist are the claymores, arquebuses, and pikes on the walls of the entrance hall, the great leather jugs near by, and the choice china and pottery scattered through the rooms. Portraits of the members of Royal families of England and Denmark, views of Copenhagen and the King's palace, clever sepia and crayon drawings of the Prince and his companions, sledge-driving, deer-stalking, grouse-hunting, and always smoking, with some of John Leech's sketches from *Punch*, are hung everywhere. The ceilings of the chief rooms are painted with birds in floral borders. The furniture is everywhere of comparatively simple and "useable" character. The last apartments visited were the bowling-alley, billiard and smoking-rooms, on the terrace front. There was not much to detain the members at Sandringham Church, except the singular stone lattice tracery, pierced in patterns in the belfry windows of the massive tower, the small lancets of stained glass, representing saints, in south porch and west end of nave, probably executed c. 1450, and the fine wooden font cover, richly pinnacled, and suspended over the basin by chain and bracket upon north wall. The church is of local Carrstone, with freestone dressings. It was restored by the late S. S. Teulon forty-five years since, and again more recently by Mr. A. W. Blomfield, B.A. At the present time alterations are being carried out in the chancel, at the Prince of Wales's expense, as a memorial to the late incumbent; the work consists of stained glass in north and south windows at east end, a brass plate near south-east angle, and credence table, &c. A peculiar feature is that the chancel arch is corbelled over. On driving out of the grounds towards Lynn the compact and beautiful "Norwich gates," given the Prince by the county of Norfolk, and executed in wrought iron by Messrs. Barnard, Bishop, and Barnard, of Norwich, were seen.

In the evening a conversazione was held in the museum, and papers were read by Dr. J. S. Phené, "Reminiscences of an Old Scholar of King's Lynn Grammar School on the Archæology of the Wash;" by Mr. E. B. Ferrey on "Symbolism in Early and Mediæval Art;" and by Mr. Miller on "Hereward the Saxon."

FRIDAY.

The Benedictine abbeys of Thorney and Crowland, and Spalding Church, were the prominent features of Friday's programme.

THORNEY ABBEY.

The portions of the great Benedictine abbey, added to and partially encased in more recent work so as to serve as a parochial church, were the only interesting points in the modern looking village of Thorney. The west front† of the church, beautified by an octangular pierced and battlemented turret, rising from either angle buttress; between is a battlemented screen, and rows of sculptured figures over the west window. Over the doorway is the date 1636, recording some alterations to the fabric. The side aisles have been removed, and the late Norman columns, alternately round and octagonal, as at Ely and other contemporary buildings, are built into the walls (which are evidently inspired by the greater example at Peterborough), the triforium and clerestory being left intact. The east end and shallow transepts were added by Blore in 1840, and the contrast between the mechanical, clumsy work, and inaccurate details of his "Norman," with the freedom and variety of the original work, to this day left unfinished, serves to point a moral as to the impossibility of "falsifying architectural history" by imitative restoration. The building is vaulted with plaster, which, together with the columns and wall surfaces, is coloured and struck-jointed to imitate stone. The fittings are unworthy of the edifice, and it is noteworthy, as bearing on the "eastward position" controversy, that the unwieldy schoolmaster's-desk-like pulpit has been so placed in the central passage as to prevent the congregation from seeing the officiating clergyman when at the Communion table. The east window is filled with showy and poor modern glass, illustrating the miracles of St. Thomas-à-Becket, as depicted in the choir of Canterbury Cathedral. The Rev. R. H. Warner read a paper on the history of the abbey, noting its founding as Ancarrig (the island-fortress), in 662, by Saxulf, first abbot of Medehamstead, and its destruction in 870; the rebuildings a century later, and again between the years 1098 and 1108. He quoted the appreciative descriptions of the abbey given by Ordericus Vitalis and William of Malmesbury, and hinted that the famous Red Book of Thorney, now in the possession of the Earl of Westmoreland, might, if placed in the hands of a competent editor, afford much interesting historical information as to the abbey. Mr. Chas. Lynam, of Stoke-on-Trent, followed with a lecture on the architecture of the abbey, of which we may give an abstract in an early number. In this a careful discrimination was made of the dates of the older portions—the arcade, with its clerestory and triforium, being spoken of as a piece of ecclesiastical architecture hardly to be surpassed. The fittings introduced in 1636, when it was altered to serve as a church, and in more recent days had been dwelt upon with complacency by local historians, but he thought it would be difficult for a Benedictine monk to realise this respectable building, with its yellow washed walls, plaster ceiling, high-side pews, and central open benches, and the arrangements for the officiating ministers, as the place where were being continued the functions of his order.

CROWLAND ABBEY.

The beautiful Early English west front of this abbey, with its central portal divided by a shaft of Purbeck marble as at Ely, the rows of statues of saints and kings and the remains of a later great window were examined under the disadvantage of a drenching rain, and only a few of the more determined archæologists traced the ground plan of the abbey, as shown by bases of piers in part of nave and choir, and bare spaces in the turf corresponding with choir and apse foundations. One of the central tower arches yet remains. It is ornamented with zig-zag mouldings of bold character, and is filled up with fragments of carved stone from various parts of the abbey. The great north tower forms the porch, and the north aisle is fitted up as the parish church, and beneath its groined roof the Rev. Canon Moore exhibited a series of photographs from 13th century manuscripts, illustrative of the life of St. Guthlac, to whom and to St. Bartholomew the church is dedicated, and also a carefully drawn and coloured ground plan of the abbey church. He alluded to the fact that the foundations of the first abbey, built a quarter of a mile distant, on the ancient tumulus on which St. Guthlac's cell was supposed to have been erected about 675, were only destroyed 12 years ago by the tenant of the land who was digging for gravel. He exhibited the only plan made during the process of grubbing up the old work, which showed a chapel 84ft. by 40ft., with aisles and apsidal end. The concrete and Barnack rag walls of this chapel varied from 3ft. to 8ft. in thickness, and over 200 tons of stone were carted away. The

* Illustrated in BUILDING NEWS a few years since.

* A shooting-box on the estate was illustrated in the BUILDING NEWS, July 24, 1867, p. 108, Vol. XXVII.

† Illustrated in the BUILDING NEWS, December 3, 1875, p. 614, Vol. XXIX.

ground plan of the present abbey, which he had tested by digging on to the pier and wall bases, consisted of a nave 144ft. by 27ft. 10in., a central tower 36ft. square, transepts on either side, a choir 80ft. in length ending in apse, a north aisle (still roofed in) 96ft. by 24ft., and a south aisle, 144ft. by 11ft. The apse and part of west front are Norman, but the latter was chiefly Early English. The north tower was built in 1427, and the north aisle vaulted at a somewhat later period. The outer wall was also of the Perpendicular period, and in it the local custom was followed of re-using earlier work; thus in this they found an Early English moulding with a Perpendicular base and drip—a peculiarity which had led Mr. Freeman and others into error. It was singular to notice in the west front how the Early English was interpolated into the Norman masonry. Mr. Bloxam instanced Wroxham Abbey, Warwickshire, as another instance in which the north aisle was used as a parish church. Canon Moore said there was continuous evidence from the 15th century of this appropriation. Mr. Bloxam added that the abbey agreed in plan with the Benedictine type, in elongated choir, apsidal east end, and irregularity in width of aisles. He referred to the simplicity and grace of the groining and to the incomplete state of the chapels thrown out at the west end, and suggested that the gallery surrounding three sides of the church, more especially that over the east end, was scarcely ecclesiastical. Canon Moore remarked upon the traces of springers for vaulting to be seen in the north wall of nave, and said that, from the weakness of the walls and their great height, this groining could never have been completed except in wood. General concurrence was expressed in the suggestion, and also in that as to the date of the external walling. The ruined west front, braced and rendered secure a few years since under the direction of Sir Gilbert Scott, was alluded to by Mr. Brock as one of the gems of English Gothic architecture. The hope was expressed that the gallery might be removed from the east end of the church. The extraordinary *Triangular Bridge** was examined on the way back as well as the incessant rain would permit, surprise being felt that on such a day the space beneath should be almost dry. It is of rude masonry, and is very irregular in construction and plan. The groining of the under surfaces may indicate a date of erection late in the 13th century. The sides are steep, and the central boulder-paved platform is reached by flights of steps, unequally disposed. At some more recent period, and in a different stone, parapets have been added. On the west side of the south limb is a decayed and broken freestone statue, which has exercised the imaginative powers of antiquarians for generations. It is represented as a crowned, long-bearded figure, seated with the right hand resting on an object which may be anything from an orb or skull to the "loaf" with which this "Cromwell" is locally endowed. Canon Moore's suggestion that the figure was intended for a niche high up in the west front of Crowland Abbey is ingenious, but the figure cannot represent the Saviour in majesty as he conjectured. The bridge is unique, but is an obstruction to the village traffic; its only use is to prop up a telegraph pole reared against it by the unromantic post-office authorities. Having done justice to the luncheon given in Thorney school-room by the Duke of Bedford, the members proceeded by a circuitous rail journey, viâ Sutton-bridge, to

SPALDING.

With the exception of a few minutes spent amongst the quaintly clipped yew trees in the trim garden of Ascoughfee House—a late Elizabethan dwelling, picturesque until remodelled in 1833 by a local architect—the afternoon was spent in the great parish church of SS. Mary and Nicholas. The broad and low tower and graceful crocketed spire, set in a parapet within pinnacles and flying buttresses, are noticeable from a great distance from their visible inclination to the south. The "leaning" is, it is hoped, stayed now, thanks to the measures taken by Sir Gilbert Scott twelve years since. On entering by the great north porch the numerous ranges of columns of various heights dividing the five aisles give an impression of great intricacy of design, and a charming mystery to the vista—an effect heightened by the screening off of chancel by a lofty rood-loft of carved oak, suggesting in its overhanging cornice the more elaborate example at Llangwm. Upon it stands a large gilt and embossed metal cross, suspended from chancel arch by enriched and begilded chains. The Rev. Canon Moore, the rector, gave an address, in which he showed, with the aid of a coloured plan, the mode in which the church became the puzzling group of pillars, arches, and buttresses it now appears. As first erected, about 1280, the original church was as complete and simple an edifice as could be imagined—nave, transepts, and chancel, each as at Ely with an aisle on every side, and all uniform as to height, proportional width, and construction. It was altered in the Perpendicular period, when the strange expedient was adopted of raising the nave arcades 6ft. in height by thrusting stones of a different class just below the springing, thus stilting the arches. As at Crowland, the carved work was replaced almost stone for stone in the capitals, and a clerestory added. He believed, from the weakness of the piers at the crossing, that there was never a central tower, but that the roof was simply mitred, the sanctus bell-turret now existing being added long subsequently. Even the chancel arch was stilted, so that the church was in fact a Early English church built in Perpendicular days. The aisles were next doubled in width by throwing out fresh aisles, and so were the transepts, which now became flush on faces with the fresh aisle walls. The new aisles exercised a great thrust, and so on the north side the builders, instead of underpinning, reared a solid wall at the west end, and on the south they trusted to the great tower and its spire as a counterbalancing mass. On the north side, in the bay next the transept aisle, they threw a skew arch across, and this strainer was so designed that the real defect was rendered ornamental; while, at the same time, it carried the weight of roof securely. The windows of the old aisles had to be dealt with, and on the north side one was put into the new bay to the north of its former place, the other in the north-east transept wall. The latter wall was not so thick by 6in. as the one in which the window previously stood, and the projecting hood and sill and cuspings were, as the members could see, roughly shaved off to get a nearly plane surface. The windows in east of south transept were peculiar in tracery, and this peculiarity has been repeated by Sir G. Scott in the new aisle he added to chancel and elsewhere. The alteration in the fifteenth century was most carelessly effected. In replacing a south-east nave arcade capital, after stilting, the bed was not true, so that the upper part impinged on the pier. The workman had gone on with his work instead of tracing the defect down to the faulty joint, and knocked off the projecting bit of rim, leaving the arch as much askew as ever. A window at the south-east angle was turned inside-out in replacing in the new aisle; and what was now the internal surface showed previous weathering. On the opposite side the arcade was found not to be built into the wall, but to rest on the corbel, which it had crushed. Scott had the arch pinned and built in to the pier; but the removal of the plaster from the walls showed that the same scamping existed in other places, and that these courses were never bonded. Even the strainer arch was not accurately set out. The most serious evil was to the tower and south arcades. This tower had evidently been removed from some other place to the south angle. Coffin ledgers and gravestones are used up, together with portions of thirteenth-century string-courses, to face the lower part, which had but a set-off of 4in. all round. The foundation—none of the best—going only into silt, was honeycombed by more modern vaults, and a dozen years since it not only inclined to the south-west, but there was a great crevice in it through which a boy could creep at the widest part, and this extended from the base to the top of spire, and another smaller one on east. It was carefully shored-up and then underpinned, and a new foundation put in, the space around being concreted to aid the footings; and although the spire still leaned, the mischief had since gone no further. All the arches on the south side were cracked and crushed by the pressure of the tower and their own weakness, and the ruin was only averted by the buckling-up of the eastern arch. These were renewed and buttresses added, so as to prevent a recurrence of the danger. The plans showed that the nave, as it stood, was 100ft. long by a total width of 96ft.; across the aisles the chancel was 57ft. long. During the restoration a chamber was found to exist over the eastern part of nave in which were traces of machinery. It seemed to have been used for the working of figures upon the great rood screen in the miracle plays commonly performed in churches during the middle ages. The rood screen had been restored from the pieces still existing, all of which were worked up into it. Mr. Brock said the practice adopted at Spalding of adding successive aisles as a larger church was needed, was more suited to the wants of a congregation than the more common plan of lengthening at the west end. The church was then viewed from the outside, the peculiarly German tracery of the south aisle, added to chancel in 1315 (and formerly used as the grammar school), being remarked upon, and stated to be unique in this country. In returning to the station the premises long (and till the previous day) occupied by the well-known Gentlemen's Society, started by the antiquary Morris Johnson, were looked at with interest, as it was stated they are about to be rebuilt.

SATURDAY.

The Roman Camp at Chesterton, the Norman Church of Castor on the opposite bank of the Nene, and Stamford town were visited on this day from Peterborough as a new centre.

CHESTERTON CAMP.

During the carriage drive to the camp the ivy-clad square tower of Thorpe House* attracted remark from its picturesqueness. The house and its tower belong to the last period of semi-fortified dwellings, and have lancet and square-headed mullioned windows used indiscriminately. The camp is on the Huntingdonshire side of the river, and can be clearly traced in outline, although ploughed for centuries. It forms an irregular parallelogram 1,000 paces in length from east to west, and half that width, contracting at the southern end to suit the rise in the land. The margin is defined by a ditch. While the members walked over the site they picked up a number of fragments of "Castor ware" pottery, with incised patterns, pieces of black-marble tesseræ, and a leaden ring, and a farmer stated that numbers of Roman coins had been found in a bed of gravel to the south. Tumuli and earthworks abound in the immediate vicinity of the camp, which is upon the east side of Ermine-street and the great York-road, here successively constructed one above the other. On the highest point in the camp Mr. Thos. Morgan read a paper identifying it and Castor with the Durobrivæ mentioned in the 5th Iter of Antoninus, and alluding to the Roman milestones, potters' kilns, pavement found within it, and to the cemetery near by. The earthworks on the hillside at Castor were, he suggested, probably an extension of this encampment, and were connected with a summer camp a mile in the opposite direction. The chain of fortifications extends for a score miles along the Nene Valley. A letter was read from Mr. C. Roach Smith, suggesting the formation of a local committee to investigate the site, which had been one of great importance as a pottery and military place, judging from the great quantity of Castor ware in existence, and the fact that there were not only two camps but the remains of an important community outside the walled stations.

CASTOR CHURCH.

This church is set on a steep slope, evidently part of the series of earthworks. It is cruciform, the most interesting feature being the central Norman tower†, one of the richest examples of eleventh-century ornamentation in the Midlands. Above the weathering lines of the old roof the tower rises in two stages,

* See illustration and plan in Building News, Dec. 7, 1877 (p. 56, Vol. XXXIII).

* Illustrated in the Building News, August 19, 1870, p. 132, Vol. XIX.

† Illustrated in the Building News, Jan. 20, 1871, p. 48, Vol. XX.

each capped by elaborate corbel tables and billet moulding. On each stage a rich string-course of cable pattern separates the tympana of a series of arcades and the intervening piers form a course of scalloped diapers. Every form of Norman ornament—wave, cable, zig-zag, and scallop—is introduced into the treatment of this tower and the corbels are grotesquely carved. Above is a 14th century pierced parapet, from within which rises a stunted spire—the least satisfactory point in the group. The church itself has been rebuilt in the 13th century, but the priest's door, with dedicatory stone in the tympanum, recording, quite legibly, that the church was dedicated 17th April, 1124, has not been altered in re-erection. Three of the tower piers are the original ones, and are sculptured with scenes from village life. In the raised east end of chancel are early sedilia and piscinæ, one of the latter blocked up with part of a floriated coffin ledger. The nave and transept roofs are of a simple 15th century type, supported by angels. In a cottage close by an excellent piece of tesselated pavement was examined.

STAMFORD.

The richness of this town in monastic and eleemosynary buildings rendered the blunder by which the members were detained at Peterborough station the more to be regretted. A luncheon was given in the council chamber by the corporation, and the mayor subsequently suggested that the Association should, at some early date, make that town its head-quarters for a week, promising a hearty welcome. The corporation regalia were exhibited; there are three maces of various sizes, the largest (which is uncrowned) weighing over 20lb., and a good specimen of the silversmith's craft two centuries since; a great punch bowl, curiously chased and embossed, also silver gilt, of somewhat later date, and various silver vessels. After leaving the town hall the principal curiosities of the town were shown and described by the Rev. C. Nevinson, who acted as guide during a perambulation. Opposite the town hall the members entered some *vaults* under dwellings, and glanced at the beautiful 13th century groining, resting on pillars and responds, with bell-mould caps. Nearly opposite is *St. Mary's Church*, noticeable for the Early English arcaded tower and lofty broach spire, banded and broken up by canopied spire lights; and for a "golden chantry" on north side, with painted and panelled ceiling (dated 1467), and between this chantry and the chancel a richly-carved altar tomb, on which are male and female effigies. These are said to represent Sir R. and Lady Phillips, tempo Henry VII., but it was remarked that the armorial bearings and devices only relate to the Tudor family, and that the costumes are a score of years later than the deaths of the Phillips's. At St. George's Church it was stated by Mr. Nevinson that till recently the windows contained a quantity of stained glass, representing the garter, &c., and put in by Sir W. Burges, a fifteenth-century garter king-at-arms. Of this nothing is now visible but small fragments. The church has been, and is being, restored by a Stamford architect, and regret was expressed at the destruction of work of historical interest. Some discussion occurred outside the west front of *St. Leonard's Priory* * as to whether the carving was really of the Transitional Norman period, or was partly a restoration, the freshness of appearance and seeming incongruity of some details being adduced against it. Mr. E. B. Ferrey urged that it was a genuine well-preserved fragment of twelfth-century work. Nothing remains of the small priory but the arcades of the nave as far as the crossing, walled in and used as a cartshed, and the west front. The columns show that the nave was extended westward by two bays at some slightly later date, the eastern caps being chamfered, while the others are carved with horizontal roll members. The *Gate-house of the Carmelite Friars* was described to the visitors as of the date of Edward I., but the shields of arms and mouldings and ornamentation generally appear subsequent in date. The remains of *Brazennose College*, which at one time threatened to be a formidable rival to Oxford and Cambridge, consist chiefly of a pointed arch of many roll members, and some stone walling of the period (1265), to which it is attributed. *St. Paul's Church* is now used as a grammar school. It contains some interesting Late Norman work in foliaged capitals beneath the arcades, billet courses, sedilia, &c., of the Early Decorated period. At the side of the playground is a large Victorian Gothic master's and boarding house, erected from the designs of Messrs. Hay and Oliver. In the *Bede House* of *Brown's Hospital* were exhibited a series of charters and documents written between the years 1493 and 1610. The building itself was altered at the latter date, when the hospital was re-founded, but there is some good stained glass in Perpendicular tracery. Next was seen the great *Church* of *All Saints*, with Late crocketed spire, rivalling that of St. Mary in beauty of proportion. With the exception of this tower and chancel the church is Early English, and has considerable remains of elaborate panelled arcading of that period, carried round the building beneath the window openings. There are several brasses to wool merchants, giving the costumes of that class during the 15th century. The small *Church* of *St. John* is very Late, and has a good angel-corbelled hammer-beam roof supported on lofty arcades, and some carved woodwork in chancel. There was no time to carry out the whole of the programme, as the members were returning to Wisbech for a concluding meeting at the council chamber of the town. Here Mr. W. de Gray Birch explained the corporate charters and records, and the MSS. lent on exhibition, and a series of votes of thanks were passed to the Mayor, Corporation, and local committee. A portion of the party had proceeded from Stamford to *Peterborough*, where the *Cathedral* was visited, and described by Mr. Burgess. Some measures must be taken before long with reference to the central tower. The gaping cracks in the south and east faces of the lantern appear wider than they did on our previous visits; and works of repair are beginning to be needed in the beautiful west portal, the south transept, and several other parts of this grand old minster. Some discussion took place as to the curious and much-worn Purbeck marble shrine at the east end of the south aisle, which Mr. Bloxam pronounced, from the style of sculpture, to be that of Kyneburgh and Kyneswith, sisters of Penda, King of Mercia, whose remains are known to have been removed here in the first half of the 11th century. There was, he said, no authority for the common supposition that it is a memorial to Abbot Hedda and his monks, slain by the Danes in 870.

MONDAY.

The headquarters for the last two days were removed to

CAMBRIDGE.

To attempt to describe in detail the churches and college buildings, and their antiquarian and literary treasures, seen by the Archæological Association during their stay in the University town, would be but to occupy space with what has been exhaustively dealt with elsewhere. We must confine ourselves to an outline of the points visited. In the *Guildhall* the members were, on their arrival from Wisbech, received by the Mayor, who showed to them the comparatively modern regalia and charters, beginning with those granted to the town by Henry III. in 1225 to one from Philip and Mary. They proceeded at noon to the monotonously magnificent *Chapel* of *King's College*. The scheme of the twelve immense stained glass windows on each side and that at the east end was explained by the Rev. Canon Churter, who remarked upon their beauty of colour and harmony, and added that although they were contracted for by English workmen, the designs and the choice of parallels in upper and lower double lights of subjects from the Old and New Testament were probably by artists from Flanders. The fan-tracery and pendants of the groined roof, the chantries in buttreses, the wood carving, and the heavy organ screen, having been pointed out, the more agile members ascended to the high-pitched leaden roof, from whence the towers and turrets, spires and roofs of the 'varsity town, and parts of seven adjacent counties were distinguished. In descending, the space between the groined vaulting and this cover was entered. The great principals by which the weight of metal in this outer roof is carried are of many beams braced together and arranged cradlewise, with a collar-beam securely morticed across each set, which have been further tied by large iron rods at the feet. The purlins and ridge piece are of massive dimensions. Although the design is that of Henry the Eighth's time, most of the timbers are quite new, having been renewed and strengthened with iron under the direction of the late Sir Gilbert Scott. From King's College the party proceeded to the *Fitzwilliam Museum*, the decoration of which with choice marbles and gilding is year by year carried to greater completeness as funds accrue from the estate. Here Professor Sidney Colvin acted as cicerone, and in a few well-chosen, ofttimes glowing, sentences described the principal contents. The pictures generally, he said, were chiefly of the schools, but more than half a dozen are of the finest class. Of these a first sketch in a corner of the main gallery, by Titian, for the Venus now in the Dresden Gallery, was one distinguished for purity of tint and arrangement, and the balance of light and shade. A sketch, by Vandyke, of a child leaning on a skull, is excellently drawn. Portraits by Hogarth of Dr. Arnold and daughter were amongst the most perfect specimens of the caricaturist's brush; the painter had evidently a congenial subject in the bull-dog countenance of the old gentleman. In the chief room were displayed a selection from the collection of early engravings belonging to the University. All those shown were executed about the year 1500 by Albert Dürer and other German artists. Amongst these was the first known example of colour—a portrait of H. Paumgartner, engraved from three blocks in black and two shades of brown, by Jost. de Necker, in 1512. This exhibited a wonderful effect in its disposition of colour. In the basement the Professor directed attention to the last acquisitions amongst the casts—copies of the new treasures from the Temple of Zeus at Olympia, executed at Berlin. These are gigantic in size, very perfect in the faces, and represent the struggles of the Lapithæ women with the Centaurs; are known to have been executed by Alkamenes, c. 734 B.C., and are of great beauty and grace of execution. In this room is a case of glass vessels from the island of Cyprus—of every time, from the rudest Greek work to the latest and heavy forms of Roman date, and even some examples of Byzantine art. They consist of vases, bottles, and other vessels, mostly very small, and to their natural purples, ambers, and greens, have been added the irridescent charms of decay, making them gleam at every fracture with the changeful lustre of mother-of-pearl. The members had to hurry away from hence to *Peterhouse*, whose claim to be the oldest college was disputed on the following day at St. John's. The chapel, which smelt strongly of varnish, was said to be the only one fitted exactly as when erected in 1610. Considerable difference of opinion was manifested as to the beauty or otherwise of the modern Munich glass, executed from the designs of Prof. Aimmüller. On the north side of the second court are new combination rooms and hall (erected 1870), of which Mr. G. G. Scott, M.A., was the architect. In the cellar was seen an ancient font, circular with four square projections, of Decorated type; it was found during the restoration, and left in the basement rather than remove a window to raise it. Its desecration, by being used as a receptacle for old corks, was strongly condemned by some of the visitors, while others regarded it as but the base of a column—a theory disproved by its form and proportions—or, what appeared more possible, of a market cross. Some of the gold plate is Flemish, of Henry VIII.'s time. *St. Mary the Less' Church* near by, also restored by the younger Gilbert Scott, was rebuilt in 1350; it has no tower, and is throughout of one period. Beneath the chancel is a crypt of two bays discovered 11 years since, and belonging to the original E.E. church. At *Queen's College*, the most picturesque of the University buildings, the chapel and common hall (the contract for roofing which, and dated 1479, still exists) have been restored by Mr. G. F.

* Illustrated in the BUILDING NEWS, Jan. 3, 1873 (p. 10, Vol. XXIV.), and Jan. 26, 1877 (p. 83, Vol. XXXII).

Bod'ey. The colour decoration is quite sufficiently bright in tone at present. Time will much soften the effect. The mullioned windows and brick and woodwork of the room and attic occupied by Erasmus, in a tower at an angle of a quaint little court, were seen from the grass plat; and in the president's lodge, the library, and elsewhere, are several portraits of the great divine, each revealing the same cadaverous, ill-at-ease countenance. After a flying peep at plain *St. Catherine's College*, and upon the wood carving in hall and chapel, the party went on to *Corpus Christi College*, in which the attraction was the manuscripts in the library, and especially the "Anglo-Saxon Chronicle" and the Augustinian Gospels. The day's sightseeing closed in the very early *Church of St. Benedict*, where the claims of a pre-Norman origin for the tower appeared well sustained by the long and short work, the ponderous masonry and walling, and the turned ballusters in the windows. It is probably a little later than the churches at Deerhurst, Earl's Barton, and Barnack, visited by the Archæological Institute in their last two meetings.

In the evening a meeting was held at the Guildhall, when a discussion took place on the camps at Chesterton and Castor, as compared with the one recently opened at Irchester. Mr. Burgess regarded the first-named station as a walled camp once defended by a wet fosse; the Rev. R. L. Baker detailed the explorations carried on at Irchester, and, together with Mr. Brock, urged the desirability of commencing a similar work at Chesterton—a link in the same chain of Roman fortifications on the Nene. The Rev. E. Beresford said that outside Chesterton Church was a mediæval stone coffin weighing two tons half concealed by grass and shrubs. Mr. Morgan then read a chronological history of the colleges of Cambridge.

TUESDAY.

The perambulation of Cambridge was resumed at 9.30 a.m., under the guidance of the Rev. S. S. Lewis, M.A., hon. sec. Cambridge Antiquarian Society.

The compact court of *Clare College*, one of the best and greatest examples of a Jacobean quadrangle, was the first point visited, and the new chapel, designed by the late Sir Digby Wyatt, entered, and the modern oak fittings inspected. On the way to Trinity Hall the ruins of a fine Tudor gateway at the rear of King's College were examined. The greater portion has been removed to make way for an extension of the University Library, and at the present increase of books it is clear the remainder of the site will be required before the close of the century. Regret was expressed that this fine piece of brickwork and carved masonry should be allowed to fall to pieces, and hopes expressed that the remaining fragment might be rebuilt elsewhere. At *Trinity Hall* the library was the great attraction; here and in Hereford Cathedral are said to be the only collections of chained books. In this instance the books are enclosed by bars. The plate was exhibited, and pronounced to be chiefly Jacobean, with a well-chased silver-gilt standing cup of German manufacture, not later than 1500. At *Gonville and Caius College* a warm discussion took place as to the authenticity of the celebrated Gate of Honour. It exhibits a singular mixture of Tudor and Renaissance work in the portal, while the side wings and upper story are almost purely Palladian. Messrs. Wright, Burgess, and others urged that only the centre portion was so early as 1574, the accepted date of erection, the rest being post-Restoration additions, but Messrs. Lewis and Reynolds argued for the almost concurrent building of the structure. The new street front of this college, recently erected from the designs of Mr. Waterhouse, A.R.A., was criticised, the general verdict being favourable. A long stay was made at *Trinity College*. From the Palladian chapel, decorated with secondary and tertiary colour in floor, stencilled walls and ceiling, and with brighter stained windows, and containing many statues and much of Gibbons's carving, the visitors went to the master's lodge, and after seeing the pictures in the royal apartments and elsewhere, proceeded to the library, where the Rev. Mr. White read a paper on the Anglo-Saxon remains found in a cemetery recently opened near Orwell, Cambs. The articles themselves were exhibited in cases, and were numerous and varied in character. *En route* to St. John's College the new Divinity Schools * in course of erection, from Mr. Blomfield's designs, were seen; the principals of roofs are being raised, and the external walling of specially-made red bricks, with plentifully carved freestone, is nearly completed. The style is Late Perpendicular. In the Jacobean library of St. John's, Professor Mayer delivered an address upon the history of the college, claiming for it the senior rank in the University. The covered bridge and Rickman's court beyond, having been seen, a return was made to the very late Tudor Combination-hall, and thence to the new chapel, built from Sir Gilbert Scott's designs. We have recently † illustrated the great square tower at the west end, which certainly is not sufficiently lofty in proportion to the high roof of the chapel. In the south-east angle of the chancel has been preserved a fragment of the old hospital of St. John—two intersecting arches and responds of late 12th-century character. It has, unfortunately, been re-tooled. The *Round Church of St. Sepulchre* was next visited, and here Mr. Tom Burgess, F.S.A., delivered an address on the round churches of England, referring to recent discoveries at Dover, and claiming for all five edifices a like origin. Only in the Northampton church was the history of erection known. The space under the round appeared to have been intended to be occupied by a font. Mr. Loftus Brock deprecated the entire destruction of the Perpendicular stages of the turret over the round in the restoration by Salvin, although there was structural evidence that the new stone vault reproduced the original capping. In the afternoon the members proceeded to Magdalene College, where the library of Samuel Pepys was examined—the original manuscript volumes of the famous Diary attracting much attention. The 15th-century chapel, the pictures in the combination-room and master's lodge, having been seen the members proceeded to the mound on which stood the old castle, and to the Roman wall and fosse near by. The Congress proceedings were fittingly closed by a visit to ivy-clad *Jesus College*, the most venerable in appearance of the University buildings, where the Early English chapel and other remains of the nunnery of St. Rhadegund and the 15th-century hall were viewed with much interest.

TRURO CATHEDRAL.

Announcing Mr. J. L. Pearson's appointment as architect for the new cathedral of Truro, the *Guardian* says:—"It is no ordinary work which it is now proposed to intrust to Mr. Pearson, and we are sure that he will fully realise its importance, and devote his very best powers to it. If we might venture to offer advice to one so distinguished in his profession, we would say that he would do well to spend some little time among the churches and ecclesiastical remains of Cornwall, and become penetrated with their spirit before he begins his design. A cathedral for Cornwall should be a totally different building from a cathedral for Liverpool or Wakefield. Nowhere is the *genius loci* more strongly marked, and in nothing should it be more plainly stamped, than in the Cornish Cathedral. Of course, the local material, granite, will be employed, the proper use of which is in itself a study. But Mr. Pearson knows what he is about, and Truro Cathedral is safe in his hands. We may look forward to a cathedral of no large dimensions or elaborate ornamentation, but original in character, and of dignity of outline, worthy to rank among the older cathedrals, which are the glory of our land. The existing cathedral will pass away with little general regret. It is a commonplace Cornish parish church, of no high excellence in its own class. The destruction of an ancient parish church, it is true, is always to be deprecated. But there are occasions—and this is one of them—when such destruction is necessary to secure a greater good. Who would not wish it had been possible to preserve the Confessor's Abbey at Westminster, and Remigius' Cathedral at Lincoln? And yet, who does not rejoice at the bold destructiveness of Henry III. and St. Hugh, which gained for us the lovely piles which now occupy their sites? The appeal of the Society for the Preservation of Ancient Buildings against the demolition of St. Mary's, Truro, has not, we know, been disregarded by those in authority; but it has been found simply impossible to do what they desired. No other site was procurable than that of the existing church; while if, on other grounds, such a course had been advisable, the limited area at their command entirely precluded the committee from entertaining the proposal of retaining the old fabric and erecting the new cathedral by its side. We fear also that it will be hardly possible to use any of the architectural features of the old church in the cathedral to be built. But all may rest assured that Mr. Pearson is not a man who will wantonly destroy anything ancient, and that, if any part of the old church can be preserved without crippling his design, he will preserve it."

* See the Building News for Dec. 29, 1876 (p. 662, Vol. XXXI.).

† In the issue for March 23, 1877 (p. 290, Vol. XXXII.).

Bangor Cathedral.—A pulpit has been erected as a memorial to the late Rev. Morris Williams, M.A., rector of Llanrhyddlad, Anglesey. It stands about 8ft high, and has been sculptured from the designs of the late Sir Gilbert Scott, by whom the chancel of Bangor Cathedral was restored. It is of Caen stone, springing from a column of the same material, and rests upon clustered marble shafts. The work has been executed by Messrs. Cox and Son, Southampton-street, Strand.

The Institution of Civil Engineers.—The council of this incorporated society have awarded the following premiums for some of the original communications presented during the last session, on account of the science, talent, or industry displayed in the consideration of the several subjects dealt with:—*For Papers Read at the Ordinary Meetings:* 1. Telford medals and Telford premiums to Richard William Henry Paget Higgs, LL.D., Assoc. Inst. C.E.; and John Richard Brittle, Assoc. Inst. C.E., for their paper on "Some Recent Improvements in Dynamo-Electric Apparatus." 2. A Watt medal and a Telford premium to Henry Davey, M. Inst. C.E., for his paper on "Direct-acting or Non-rotative Pumping Engines and Pumps." 3. A Telford medal and a Telford premium to Thomas Curtis Clarke, M. Inst. C.E., for his paper on "The Design generally of Iron Bridges of very large Span for Railway Traffic." 4. A Watt medal and a Telford premium to Bradford Leslie,* M. Inst. C.E., for his paper on "The Hooghly Floating Bridge." 5. A Telford premium to James Atkinson Longridge,† M. Inst. C.E., for his paper on "The Evaporative Power of Locomotive Boilers." 6. A Watt medal and a Telford premium to Alfred Holt, M. Inst. C.E., for his "Review of the Progress of Steam Shipping during the last Quarter of a Century." 7. The Manby premium to Edward Bazalgette, Assoc. Inst. C.E., for his paper on "The Victoria, Albert, and Chelsea Embankments of the River Thames." *For Papers Printed in the Proceedings without being Discussed:* 1. A Telford premium to William Cawthorne Unwin,† B.Sc., M. Inst. C.E., for his paper on "The Centrifugal Pump." 2. A Telford premium to John Lewis Felix Target, Assoc. Inst. C.E., for his paper on "The Main Drainage of Paris, and the Utilisation of its Sewage." 3. A Telford premium to George Wilson, M. Inst. C.E., for his paper on "Irrigation in the South of France; Department of the 'Bouches du Rhône.'" 4. A Telford premium to Frederick Cadogan Barron, M. Inst. C.E., for his paper on "The Works of the Bilbao Iron Ore Company in the Province of Biscay, Spain." 5. A Telford premium to William Carson, M. Inst., C.E., for his paper on "The Egremont Ferry Landing." *For Papers Read at the Supplemental Meetings of Students:* 1. The Miller scholarship to William Bell Dawson, Stud. Inst. C.E., for his paper on the "Eastern Canal of France, for Establishing a Line of Water Communication from the Saone to the Meuse." 2. A Miller prize to Percy Wilson Britton, Stud. Inst. C.E., for his paper on "The Construction of Plate Girder Bridges." 3. A Miller prize to Arthur Cameron Hurtzig, Stud. Inst. C.E., for his paper on "Some Formulæ for Pile Driving." 4. A Miller prize to Arthur Spence Moss, Stud. Inst. C.E., for his paper on "Two Miles of Bridge Foundations, or Foundation Works at the Tay Bridge." 5. A Miller prize to Alfred Weeks Szlumper, Stud. Inst. C.E., for his paper on "Lead Mining, and the Washing and Dressing of the Ores of Lead, Copper, Tin, and Zinc, and the Smelting of the Same." The Howard quinquennial prize for 1877 to Henry Bessemer, M. Inst. C.E., as—in terms of the bequest—the inventor of a new and valuable process relating to the uses and properties of iron.

* Has previously received a Telford medal.

† Have previously received both Telford and Watt medals.

COMPETITIONS.

LLANDUDNO SCHOOL BOARD.—Twenty-one sets of designs were submitted, and the board determined to obtain professional assistance. Mr. Richard Owen, of Liverpool, was selected as adjudicator, and the design submitted by Mr. Foulks, of Llandudno, was selected for execution.

ST. LUKE'S CHURCH SOUTHPORT.—Out of the five sets of drawings submitted in competition for the above church those under the motto "Mediæval" were selected, the authors being Messrs. Mellor and Sutton, architects, Southport. The church is to be faced with brick inside and outside.

ARCHITECTURAL & ARCHÆOLOGICAL SOCIETIES.

CAMBRIAN ARCHÆOLOGICAL ASSOCIATION.—The Cambrian Archæological Association held their annual gathering last week at Lampeter. The first meeting was on the Monday evening, but, contrary to the usual custom, the president (the Bishop of St. David's) did not deliver his inaugural address till the next evening. The first visit was to Dolancothy, where the remains of Roman baths were visible at Tregoch, on the estate, besides a museum of Roman and British antiquities at the house itself. In his address at the evening meeting, the Bishop lamented that the clergy were not better archæologists, for then "much false restoration, more properly called destruction, would have been prevented in our parish churches."

SOMERSETSHIRE ARCHÆOLOGICAL SOCIETY.—The annual meeting of this society has been held on Tuesday, Wednesday, and Thursday this week at Bruton, under the presidency of Canon Meade. After the president's address on Tuesday, the members were invited to lunch at the house of Mr. Dyne; then there was an excursion to Withan, for the purpose of inspecting the Carthusian Church of St. Hugh, of Lincoln, and the Guest House and Priory Fishponds. Returning to Bruton a visit was paid to the parish church, the abbey ruins, the abbot's house, and Hugh Sexey's hospital, and in the evening there was a meeting at King's School when papers of local interest were read and discussed. On Wednesday, at ten o'clock, the society left for Creech Hill and visited the Inferior Oolite quarry; the church at Milton Clevedon; Batcombe Church; the camp at Small Down; Evercreech Church; and Ditcheat Church and Manor House, and the church at Castle Cary. Mr. B. Ferrey, F.S.A., and others commented on the various points of architectural interest visited, and in the evening there was a meeting for the reading and discussion of papers. Yesterday the society visited the Conventual Buildings at Stavordale; Penselwood Church; Penpits, under the guidance of Mr. T. Kerslake; afterwards proceeding to Stourton, to inspect the church and cross, Stourhead House, the museum of the late Sir R. C. Hoare, returning to Bruton by Alfred's Tower.

YORKSHIRE ARCHÆOLOGICAL ASSOCIATION.—The members of this association had their annual excursion on Wednesday, the place of meeting being Selby. The programme included a visit to the parish of Hemingborough, an inspection of the church at that place, and, on the return journey, an inspection of the Selby Abbey Church. Papers and addresses were read by Mr. Fairless Barber, Mr. J. T. Micklethwaite, Mr. James Fowler, and others.

At the monthly meeting of the London Association of Foremen Engineers and Draughtsmen, to be held at the Cannon-street Hotel on Saturday, Sept. 7th (8 p.m.), Mr. J. W. Butler will read a paper on "Silicated Stone Pipes for Drainage and other Purposes." Non-members interested in sanitary engineering, &c., are invited to attend and share in the discussion.

In last week's report of the British Archæological Association's Congress at Wisbech, the name of the author of a paper on "Wisbech Castle" should be Dawbarn not Dambarn.

A soldiers' institute, with reading-rooms, refreshment bar, and other conveniences, and a large lecture hall, is about to be built in the Lewes-road, Brighton, from plans prepared by Messrs. Holford and Clayton, of that town.

The land adjoining the railway station at Brighton, recently sold in plots by the company, is likely to be soon occupied. Premises for Mr. Hudson, of London and Brighton, are about to be built by Mr. Chappel, from plans prepared by Mr. N. E. Wallis, of Westminster Chambers, and new offices and warehouses for Mr. R. H. Penney are being erected under the superintendence of Messrs. Holford and Clayton, architects, of Brighton.

We may add to our remarks in connection with the house on the West Brighton Estate, illustrated in the BUILDING NEWS of the 16th inst., that the footways of this house have been laid with "Seyssel" asphalte, executed by "The Seyssel and Metallic Lava Asphalte Company, 38, Poultry, the contractors to the estate.

Building Intelligence.

BALDOCK.—For the last twelve months the alterations and additions to the Three Counties' Asylum, Baldock, Herts, have been going on very rapidly and considerable progress has been made. The east wing is up, and partly covered in. The west wing has now been brought up one story. The new church has been commenced, and brought up to floor line. On the 13th inst., the foundation stone was duly laid. Messrs. Fowler, Jones, and Son, of York, are the architects, the contractors being Messrs. Bellerby and Biscombe, of the same city.

BRIDGERULE.—The church of St. Bridget, at Bridgerule, near Holsworthy, has recently undergone restoration, under the superintendence of Mr. J. P. St. Aubyn, architect. When the plaster was taken off the walls an old doorway in the east wall of the transept, which evidently led to the rood loft, was discovered. There was also a piscina found in the south wall of the chancel. The timbers in the roof were all covered with plaster. This has now been removed, and all the woodwork is shown. The chancel has been entirely re-seated with benches of pitch-pine wood. The chancel has also been raised, and the floor is paved with Goodwin's tiles. The aisles are paved with slate on edge arranged in squares, but, so far as we know, this is the only church in the neighbourhood in which all the floor of the aisles is laid in this way. The general effect is very pleasing, and it is thought that this kind of floor will answer very well. No noise is made by people entering church late, and the floor can be kept clean by brushing only. A pulpit has been placed at the end of the chancel on the north side. Two new windows have been put in, the stonework having been done by Mr. Abbot, of Launceston, and the glass by Messrs. Fouracre, of Stonehouse.

LEEDS.—The whole of the interior of the Victoria Hall and vestibule of the Leeds Town Hall has been undergoing thorough repairs and re-decorations at the hands of Messrs. Roodhouse and Sons, upholsterers and decorators, of that town. The ceiling of the hall is semi-circular, and divided into five bays, richly decorated and gilded, and supported by Corinthian columns, the caps of which, and entablature above, are richly gilt. The wall space betwixt each cluster of columns is formed into panels, with border of lighter colour than the ground, producing a very chaste effect. Above the panels a sub-frieze is formed, bearing suitable Latin and English phrases, alternated—as "Magna Charta," "Weave truth with trust," &c.—on a rich dark lake ground, with gold-colour antique letters. Above this, and forming the frieze of the cornice, is inserted a rich-coloured Devonshire marble (imitation), relieving the subdued tints of the walls, and giving the ceiling a most beautiful effect. The bases on which the columns stand, and which form a dado of 8ft. all round the hall, are painted in imitation of rare marbles—the plinth is porphyry, above that is a margin of granite, and over that a moulding of Sicilian; the panels are verd-antique, and stiles of Ross of Mull. A novel feature in decoration is here introduced with marked success—the shafts of the columns, which are marbled a rich Russo-antico, are varnished in the ordinary way, then felted down with ground pomice-stone and deadened, giving a semi-polished appearance, without the harsh glare usually seen on polished or varnished work, and producing a wonderfully stone-like effect. The bases of these columns are black, with gold toras mouldings. At the south end of the hall, over the new gallery, are five panels, with hand-painted decorations. The central one contains the Leeds arms, to the left is the clothworkers' arms, to the right the ironworkers' arms; the outer ones are decorated with Mercury's mace. The magnificent organ, which is one of the largest and best in the country, is decorated in soft colours, and very richly gilded, the ornament being outlined. The carved festoons and figures are gilded in solid, the radiation of central circle being relieved with platini metal; the mouths of the pipes are decorated alternately blue and red, with gold enrichments; the semi-dome over the organ being pale blue and starred with gold. The vestibule is carried out in much the same manner as the Victoria Hall, except a blue dome with gold stars, and the lower walls diapered. The large spandrels in the upper part are filled in with a decoration naming the quarters of the globe, and the dado is here of real polished granite 8ft. in height.

More than Fifty Thousand Replies and Letters on subjects of Universal Interest have appeared during the last ten years in the ENGLISH MECHANIC AND WORLD OF SCIENCE, most of them from the pens of the leading Scientific and Technical Authorities of the day. Thousands of original articles and scientific papers, and countless receipts and wrinkles embracing almost every subject on which it is possible to desire information have also appeared during the same period. The earliest and most accurate information respecting all new scientific discoveries and mechanical inventions is to be found in its pages, and its large circulation renders it the best medium for all advertisers who wish their announcements to be brought under the notice of manufacturers, mechanics, scientific workers, and amateurs. Price Twopence, of all booksellers and newsvendors. Post-free 2½d. Office: 31, Tavistock-street, Covent-garden, W.C.

TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.]

All letters should be addressed to the EDITOR, 31, TAVISTOCK-STREET, COVENT-GARDEN, W.C.

TO OUR READERS.—We shall feel obliged to any of our readers who will favour us with brief notes of works contemplated or in progress in the provinces.

Cheques and Post-office Orders to be made payable to J. PASSMORE EDWARDS.

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The charge for advertisements is 6d. per line of eight words (the first line counting as two). No advertisement inserted for less than half-a-crown. Special terms for series of more than six insertions can be ascertained on application to the Publisher.

Front Page Advertisements and Paragraph Advertisements 1s. per line. No front page or paragraph Advertisement inserted for less than 5s.

Advertisements for the current week must reach the office not later than 5 p.m. on Thursday.

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Cases for binding the half-yearly volumes, 2s. each.

RECEIVED.—G. and S.—M. and Co.—G. E. H.—E. and Co. L.—W. H. S. and Sons, L.—G. W. R. Co.—V. Bros. —J. B.—J. J. F. B.—C. H. and Co.—W. B.—B. B. Co. —C. L. R. Co.—J. V.

DRAWINGS RECEIVED.—H. and C.

DRAWINGS RETURNED.—E. W. P., H. H., I. B., T. A.

CONTINENT. (Query is an advt.)

The memorial stones of a new Wesleyan Sunday school were laid at Rhyl last week. The style is Early English, and the estimated cost £1,000. Mr. Ellison, of Liverpool, is the architect, and Messrs. Foulkes and Son, of Rhyl, the contractors.

Mr. Swire, late second master of the Leeds School of Fine Art, and formerly of Keighley, has just been selected out of 14 candidates, as head master of the Wakefield School.

The North-end branch of the Liverpool Sailors' Home was opened last week. The style of architecture is Gothic, freely treated. Accommodation is provided for 140 seamen and four mates, besides the officials. The architects were Messrs. Hoult and Wise, and the builders Messrs. Jones and Sons. The cost of the site and the building was about £26,000.

The Cabmen's Shelters Fund committee have just purchased and placed on Holborn-hill the shelter which took the prize at the Alexandra Palace cab show. Another shelter has recently been erected by the committee in Pont-street, Belgrave-square.

A new Roman Catholic church at Middlesborough was opened last week. It is of red brick, with stone interior facings, 150ft. long by 62ft. wide.

Over £800 has been collected as yet for the Sir Gilbert Scott memorial.

On Saturday the guardians at the Bury Union opened a new infectious hospital close to the workhouse. The patients are to be accommodated in four several and distinct blocks, each one of which is fitted up complete in itself as a separate hospital. All the rooms are warmed throughout by means of Shillito and Shorland's patent Manchester grates, which, in their action, keep up a copious supply of fresh warm air in every part of the room.

Intercommunication.

QUESTIONS.

[5488.]—**Strength of Wood Post.**—What is the breaking weight of a 12" × 12' square Baltic fir wood post 5' 6" long? Hurst's "Architectual Surveyor's Hand-book" gives this formula—

$$W = \frac{CS}{1 + \frac{L^2}{4D^2}}$$

Spon's "Builder's Pocket-book," edit. W. Young, says, and taken from "Tarn's Tredgold's Carpentry"—

$$W = 7{\cdot}81\,\frac{D^3}{L^2}$$

In both formulæ W = breaking weight in tons, L = length of post in feet, D = diameter in inches, T = the side or least thickness in inches. The first formula worked out to three places of decimals gives the result as 5,353 tons, whilst the latter is 342 tons only. How can this immense discrepancy be explained? I also find, on examination, that the constants given in the various formulæ as to the resistance to crushing in the direction of the fibre in fir timber differ enormously, as stated by the authorities. Which is right? Tarn says: For pillars whose length is less than ten times the diameter the resistance to crushing need only be considered, and it is found by multiplying the area of section in square inches by one or other of the above-mentioned numbers—17,511 (lb.) having been given for red deal—Spon's "Pocket-book" (edit. Young) gives the same in tons—viz., 7·8. But Hurst's "Pocket-book" says: In tons, red pine, 2·20; Norway spruce, 2·50; pitch pine, 2·90. Molesworth also says: For a square rectangular red pine pillar of a height of eight times its breadth the crushing weight is 4,800lb. (about 2¼ tons) per square inch of section.—M.

[5489.]—**Measuring Painting.**—What is the proper rule for measuring doors? If I girt and add the moulding both in the width and height I obtain an excessive result.—Q.

[5490.]—**Dilapidations.**—Near the end of a lease I am called in to serve a tenant with notice to repair. He is bound to paint inside with two coats once in the seven years. Now, I find that the work is grained, and has not been touched during the period. If I order him to paint of course he will not grain; but the lease does not enable me to charge for graining. Must I, therefore, pass over the defect, or make him plain paint, and thus put out the graining?—SURVEYOR JUNIOR.

[5491.]—**Foundation Stones.**—Will "G. H. G.," or some other kind friend, let me know the usual course adopted in laying the foundation stone of a Nonconformist place of worship? Is the chamber for documents, &c., built up, or cut out of a block of stone? What are the duties of the architect on that occasion?—NONCON.

[5492.]—**Measuring Buildings.**—As I am thinking of spending a few days measuring up some example or examples of mediæval (ecclesiastical) architecture, and as I have had no experience in the subject, and have no chance of gaining any locally, I shall be glad to receive any information on the subject from some of your numerous readers who have had better opportunities, and who, I feel sure, will not withhold their experience from one so situated. Are freehand sketches made of plan and elevations on which the dimensions are figured? What is the best method of obtaining the dimensions, particularly of those parts which are situated at a great distance from the ground, as in towers, &c.? Is it safe to take the figured sketches home, and there make the plans from them; or, should only a few dimensions be taken at once, and those drawn to scale immediately? Also, any information on the choice of subjects, and the name of any book published on the subject, will greatly oblige.—COUNTRY STUDENT.

[5493.]—**Dublin.**—I expect to spend a few days soon near Dublin. Could any of your readers give a list of buildings suitable either for sketching or general study in the city, and also within a radius of twenty to thirty miles round it? I would thank them to mention recent as well as ancient buildings in their list. Architects can give information on such matters not always to be found in guide-books.—ANGLIAN.

[5494.]—**Stained Glass.**—I am particularly anxious to obtain some accurate information as to the state of the glass-staining trade in London, and should feel much indebted to you if you would kindly insert answers to the following queries (or as many of them as you can make it convenient to reply to) in your next issue:—1. State of the trade at present in London? 2. The best season in the year? 3. Is there a large country trade done by London firms? 4. What cities throughout the country (if any) compete with London? 5. Do they compete successfully? 6. Do the London firms export, and if so extensively or otherwise? 7. If London firms export, to what cities or countries do they chiefly send? 8. Is the import trade in stained glass extensive, and with what cities or countries is the import trade chiefly done? 9. From which source is the demand in this country chiefly supplied, home or foreign? 10. Prospects of the trade in London?—ARTIST.

[5495.]—**Articled Pupils.**—Is an architect's articled pupil at liberty to do any tracing or lining in, in his leisure time, for others than the gentleman to whom he is articled, and receive remuneration from them; or does the part in his articles which forbids doing work for others apply to tracing and lining in as well as designing?—PERPLEXED.

REPLIES.

[5461.]—**Stamped Agreements.**—"B.'s" reply is certainly misleading, for nine-tenths of contract documents are never singly stamped. Having employed many solicitors to draw up agreements I can safely say the practice of referring to the drawings in the manner mentioned is usual, and by no means such an invalid one as suggested. No doubt in some cases the best plan is to send the documents to the Stamp-office.—G. H.

[5463.]—**Light.**—"Architect" should consult Professor Kerr's book on ancient lights, or Mr. Homersham Cox's, or Round's; he will get every information there. But we understand the broad principles to be these: No man can claim compensation for being shut out from a distant prospect however beautiful, but he can always insist, when his windows have been in existence 20 years on their all having a good sufficiency of light, and this is held to give an opening of 45 degrees, expanding on each side and upwards.—H. AND R. P.

[5463.]—**Light.**—For a list of legal authorities consult the "Science of Ancient Lights," by Homersham Cox.—LEX.

[5475.]—**Salisbury.**—Having been a frequent sojourner in the old city of Sarum I am pleased to give "Scott" what information I possess. Of course, the cathedral is the great attraction. St. Martin's is an interesting edifice, and there is an interesting Gothic cross of Richard II.'s time, and some quaint remains of timber structures and gateways. The neighbourhood affords some interesting objects. There is Wilton, celebrated as the residence of Herbert, Earl of Pembroke—an interesting Palladian house, with some choice apartments and paintings, and a fine park; a carpet manufactory; Wilton Church, a Romanesque building of modern date, and the remains of an old priory, an arcade of which still stands. "Old Sarum," the mound of which contains some ancient relics, was the Roman city, and is about 2 miles from Salisbury, and worth inspection. Of course, there is the world-famed Stonehenge. I may also mention that some pleasant tours may be made to the north to Malmesbury, where an old abbey church of Norman date exists; to Chippenham, to Devizes, where there is an ancient Norman church and castle walls; Melksham and Swindon, which has a fine church. On the south there are Amesbury, Everley, Warminster, &c., all interesting places. At the Green Dragon, near Old Sarum, may be seen a fine example of an old chimney piece, richly carved, of Jacobean date. An ordnance map of the locality will be found of use.—G. H. G.

[5481.]—**School Windows.**—The window ordinarily used is an upper casement, to fall inwards upon centres, the lower sashes being sliding or fixed. The casement is operated upon by a lever which is known as "Elsley's patent."—G.

[5482.]—**Library.**—A collection of 400 books would make but a very small library. My way of reckoning is thus:—Average height from shelf to shelf 1ft.; average space of each volume in thickness, 1½in.; therefore each book occupies only $\frac{1}{8}$ of a foot super vertically. The depth, whether little more or less, would not make much difference in a room. Consequently 400 volumes would only occupy 50ft. super, or the space of a single large bookcase. I lately saw 1,000 volumes ranged round the walls of a study only 12ft. square.—H. Y. POWELL.

On Thursday week the memorial stones of a new Wesleyan chapel at Cottingham were laid. Mr. C. H. Payne, of Kettering, is the architect. The building will be of brick, with Bath-stone dressings, relieved with white brick, and is in the Classic style. The chapel is to be 33ft. long by 26ft. wide, with a large gallery over the entrance. It is to be built to accommodate 250 persons. The contract price is £427.

Mr. Benjamin Colls, chairman of the City Lands Committee of the Corporation of London, has died somewhat suddenly at Bray, county Wicklow.

Mr. R. Lennard, of Whitby, informs us that he was the architect of the recent restoration of Wesley Chapel, and not Mr. Falkinbridge, as we stated a fortnight since. We copied the item from a local journal, which it seems, was misinformed.

A new theatre is proposed to be erected in the Strand, on the site now occupied by Beaufort Buildings. We understand that the Duke of Westminster is interested in the scheme. Mr. Walter Emden is the architect engaged for the proposed building.

Mr. Charles Fowler, of Woburn-place, has been elected surveyor to the Duke of Portman's estate, vice Mr. Baker, deceased.

Mr. William Hopkinson, of the Corn Exchange, who was killed at Addlestone station on Monday, held a policy against accidents, for £1,000, of the Railway Passengers' Assurance Company, 64, Cornhill, E.C.

Our Office Table.

MESSRS. SALMON, BARNES, & CO., of Ulverstone, exhibit an iron and a wood revolving shutter worked by their improved patent balance weight motion, at the Paris Exhibition. The wooden shutter is of polished baywood. The iron shutter is a specimen of first-class workmanship of great solidity and strength. The ease and simplicity of the motion of the shutters is especially worthy of notice. The roller on which they coil does not work in a fixed centre, but with a backward and forward motion, regulated by a friction wheel pressing against the chain to which the balance weight is attached. In consequence of the backward and forward motion before referred to, all friction or drag on the shutter is avoided, allowing it to drop vertically into the grooves or runners. A peculiar construction of the chain is also included in the patent, which is altogether well worth attention from those requiring a revolving shutter at once safe and easily coiled and uncoiled.

WE are requested to state that Sir Joseph Whitworth having expressed a desire that some important alterations should be made in the conditions of his scholarships, the detailed rules for carrying out his wishes are now under consideration. They will be published as soon as possible. But in order to prevent disappointment this notice is given. No important changes will be made in the conditions of the competitive examination in May, 1879. But the conditions of the tenure, and of the amount of the scholarships, may be somewhat modified.

WE have before us a useful list of Swedish saw-mill owners and timber-exporters, giving the shipping marks on sawn timber, published by the Society of Saw-Mill Owners and Timber Exporters, at Stockholm. The saw-mill, port of shipment, the owner or exporter's name, address, and the shipper's marks or initials are given. The districts classified embrace the Hoparanda, Lulea, Pitea, Umea, Hernösand, Sundsvall, Gefle, Göteborg, Stockholm, and others. The tables will be found of great use to timber merchants, builders, and others who desire to become acquainted with the shipper's name or brands and the qualities. The marks and owner's name and shipments are given in an alphabetical register.

MESSRS. MINTON, of Stoke-on-Trent, celebrated their success at the Paris International Exhibition by taking their employés to Rudyard, and entertaining them there, on Saturday afternoon. About 1,700 men, women, and children were conveyed by special trains, and were joined at Rudyard by Mr. C. M. Campbell, M.P. (the head of the firm). Mr. Campbell presided at tea, accompanied by his party. They came there, he said, as a united family, to celebrate one of their great victories. They all knew—though he was sorry to say that many then with him had passed away—of the Exhibition of 1851, which was the commencement of their start in life, or rather of their successful start in life. They knew that at the Exhibition of 1851 they had the honour of gaining the highest award they could possibly have obtained in England, and it was then said that there were many other manufacturers who were very near them, and that it was scarcely possible to tell the difference. At that time Sèvres was pre-eminent for its work; but since then great changes had taken place, and they might all congratulate themselves upon knowing that whatever changes there had been, whatever advances had been made by other manufacturers, they (Mintons) had gained, in every exhibition that had taken place since 1851, the highest awards that could possibly be won. Every employé, in whatever branch engaged, from the highest to the lowest, had helped to win the honour they had gained. He wished to impress upon them how much depended upon the active exertion of each one employed for the success of any manufactory. That success was only possible where there was united effort, and he thorougly believed that that feeling animated all who were engaged at their works. Mr. George Leason, general manager of the operative departments, said he had been deputed by the workpeople to con-

gratulate Messrs. Minton on their success at the Paris Exhibition, of which they were one and all exceedingly proud. They had all laboured to produce it, but, without the determined pluck and unsurpassed energy of the head of the firm, it would have been impossible to have reached such results.

The following are the successful candidates, in their order of merit, at the recent open competition for admission to the Royal Indian Engineering College, Cooper's-hill, Surrey:—E. C. Rawson, 3,173; G. H. Le Maistre, 2,835; A. L. Webb, 2,721; A. T. Mackenzie, 2,670; G. Deuchars, 2,530; W. J. Weightman, 2,521; C. H. Hutton, 2,476; F. H. Pym, 2,411; C. H. D. Marjoribanks, 2,385; B. K. Finnimore, 2,246; W. Giles, 2,186; C. S. Rennick, 2,183; H. V. R. Kemball, 2,151; H. V. M. Phelips, 2,126; P. E. Raven, 2,092; J. H. Medlicott, 2,091; L. A. Light, 2,047; M. H. Arnott, 2,036; R. S. Strachey, 1,998; C. J. O'Brien, 1,987; J. K. E. Verschoyle, 1,985; J. J. Whiteley, 1,936; J. C. Mills, 1,934; H. L. Butcher, 1,916; C. A. White, 1,899; S. G. Batten, 1,895; E. R. Gardiner, 1,802; R. D. Buck, 1,767; D. M. Scobie, 1,762; M. H. Jackson, 1,750; W. Drew, 1,676; J. B. Chirnside, 1,643; R. H. Tickell, 1,582; F. W. Maunsell, 1,575; S. Cox, 1,570.

The death is announced, after a long illness, of Mr. Edward Thomas Stevens, F.S.A., of Salisbury, the able and well-known honorary curator of the Blackmore Museum. Mr. Stevens, who was only in his 51st year, has compiled and read from time to time to various archæological societies many able papers, and he had nearly completed another illustrated volume for the press, when the illness which has terminated fatally first came upon him. He was a Fellow of the Royal Geographical Society, as well as of the Society of Antiquaries, and his removal from his sphere of labour is a loss which will be regretted. Mr. Stevens was formerly a member of the Salisbury Town Council, and also of the School Board, but he retired from these posts in order to devote the whole of the time at his disposal out of his business to literary pursuits. His remains were interred in the Salisbury Cemetery on Friday last.

The Gas and Water Committee of the Corporation of London have lately had under their consideration the subject of the supply of water for the extinction of fires and for street washing, and they have also presented a report to the Common Council on the matter. In that document they recommend—first, that they should be authorised to have branch pipes of the size required for supplying hydrants for fires and watering laid in such streets as are about to be repaved by the Commissioners of Sewers; secondly, that where stand-pipes are to be placed by the commissioners in localities where hydrants might be required for the extinction of fires, they should be authorised to carry out the necessary works at an expense not exceeding £1,000, and also that it should be referred back to the committee to continue their action on the general question of the establishment of hydrants for the extinction of fires within the City, reporting thereon to the Court of Common Council from time to time. In the result the committee recommend, with a view to the saving of expense and inconvenience to the public, that they should be authorised to take the necessary steps for carrying out the views of the court by laying down, before the pavements are relaid, the necessary branch pipes, and affixing the proper hydrants, at an expense not exceeding £2,800, which would allow 10 per cent. for contingencies. They further recommend that they should be authorised to continue their action in the general question of the establishment of hydrants within the City, and to ascertain the best mode of proceeding therein, whether by the selection of a particular district or by applying the principle to some of the chief thoroughfares.

Accessibility is a merit so obvious in a drain trap as at once to recommend it. A new trap, patented by Mr. W. Brown, of York, and manufactured by Ingham and Sons, of Wortley, has this quality and several advantages besides, which are worth the attention of builders and sanitarians. A movable cover (which is luted with clay when the trap is laid down) ensures easy access at all times at the water line to the back of the trap and outlet. A Flate sole provides a ready means of obtaining the proper water seal, and an upright junction ventilates the trap and the house drains in connection. The trap has already received honourable notice from medical and sanitary authorities, and, we think, deserves it.

Mr. John Ashdown, of 33, Norfolk-street, Strand, architect and surveyor, died very suddenly, after a short illness, on Monday, the 26th inst. He was articled as a pupil to the late Sir Gilbert Scott, and has been a member of the profession for upwards of 30 years, and few men have been so widely known and deeply respected. His principal works were the Lambeth Cemetery; the Orphan Working School, Haverstock-hill; Bridlington Quay; Milford Haven; the designing and laying out of the town of Llandudno; Dalby House, Leicestershire; and numerous railways in Shropshire and elsewhere. The deceased, at his death, held the following appointments:—Surveyor and secretary to the Conservative Land Society and the United Land Company; architect and surveyor to the Cadogan and Hans-place Estate, Limited; he was also engaged in carrying out large works on the Alexandra Palace Building Estate; and amongst his numerous private engagements he, for some years, managed the extensive estates in Devonshire of Sir Lawrence Palk, Bart., M.P. for East Devon.

The Joint Committee of the Corporation of London and the Metropolitan Board of Works, appointed under the Kew and other Bridges Act, 1869, and the Amendment Act of 1874, has published a further report of their proceedings in continuation of that prepared and published under their direction in 1873. They give the following summary of the amounts claimed for compensation in respect of the tolls of the several bridges respectively, together with the sums respectively at which such compensations were settled. Bridges opened free:—Kingston, 12th of March, 1870, original claim, £15,600, purchase money, £15,600; Walton, 1st of August, 1870, original claim, £29,510, purchase money, £7,000; Staines, 25th of February, 1871, original claim, £80,500, purchase money, £20,125; Kew, 8th of February, 1873, original claim, £73,832, purchase money, £57,300; Hampton Court, 8th of July, 1876, original claim, £61,600, purchase money, £48,048; Tottenham Mills, 23rd of February, 1878, original claim, £7,245, purchase money, £1,750; Hellyer's Ferry, 23rd of February, 1878, purchase money, £1,568; Chingford, 22rd of February, 1878, purchase money, £3,382. There is appended to the report a statement of the existing assets and liabilities of the committee in the year 1878-9. This statement shows a probable estimated surplus of about £6,638 7s. 6d. in that year, after meeting all liabilities. The active work of the committee, they state, will now be suspended until they are called together again to receive the coal duties for the year commencing the 6th of July, 1888, with a view to the discharge of their obligations.

Messrs. Cox and Sons have recently supplied a number of gas-fittings for the mansion of T. Russell, Esq., of Possil-park, of a very ornate and special character. The works consist of brackets, pendants, &c., and are of silver-plated metal, oxidised and enriched with jewels. In some instances the work is not oxidised, but left bright, producing a pleasing variety. One of the chief features of the fittings is that all the tubes are square instead of round, the result being a novel effect well worth considering as a means of escaping the hackneyed type so prevalent in ordinary gas-fittings. The effect produced by the oxidised silver is a feature of great importance in fittings of a high class which are expected to harmonise with the artistic decoration of modern mansions. In this respect the articles under notice leave little or nothing to be desired.

The inquest on the bodies of the men killed by the fall of the arch in Alderman's-walk, Bishopsgate-street, on Saturday last, has been adjourned till Tuesday. The evidence of the foreman of the various works is to the effect that the materials and construction were good, but one labourer declared that the lime used was bad, and asserted that he had been discharged for pointing out the defective condition of the work to the deputy foreman. The jury are to visit the building in the interim, and will doubtless at the next inquiry, carefully examine the evidence last referred to. An accident of a somewhat similar character occurred on Tuesday morning last on the North-Western line just at the entrance of Chalk Farm station to the new tunnel under Primrose-hill. No report has appeared anywhere that we have seen. Railway accidents of this nature somehow frequently go unre-

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N.B.—DIAGRAMS AND PROSPECTUSES ON APPLICATION.

THE BUILDING NEWS.

LONDON, FRIDAY, SEPTEMBER 6, 1878.

THE RECESS.

ARCHÆOLOGISTS and architects are just now spending their annual holiday, some in the Champ-de-Mars, or among the Alps; others, in some quiet inland retreat or by the sea. "Art is long, time is fleeting," is an aphorism that may not inaptly be recalled at this time, for though the activities of professional life have for awhile ceased, building still goes on, and the respite from active work may be looked upon as a breathing time—a pause for renewed energy. We have had a bewildering succession of conferences, exhibitions, and archæological congresses of late, and it may be fairly enquired what has been the effect of them? Have they added their quota of architectural ideas, or assisted in the propagation of any principle of value to the numerous industries engaged in building, or its kindred arts of domestic comfort or decoration? Only at this particular season can the journalist find the opportunity to take a dispassionate survey of these and other questions that have presented themselves during the session, but which more pressing daily topics have excluded. Last week we concluded our reports of the two leading annual gatherings of the archæological societies, the sequel of a more than usual active session in architectural conferences and art displays. At the onset, we are met by the undoubted fact of the hostile relations existing between modern art and archæology. Architects have so long been under the teaching of archæologists, that they are now calmly told there is no architecture at all, while archæologists themselves are divided into two well-marked schools—those who tolerate restoration, and those who protest against it as destruction. Another and broader question is the influence of exhibitions on our art, whether they are helping to improve the public taste or to deteriorate it. Other subjects are the construction and materials of buildings. We may casually glance at a few of these subjects, beginning by referring to the Paris Exhibition, and asking the question if it has answered the expectations formed, and, if not, in what particulars it has failed.

The Paris Exhibition opened amid a flourish of trumpets on the Champ-de-Mars, and, now drawing to a close, led the anticipations of the novelty-seeking public to expect something unexampled in the way of artistic triumphs, while not a few artists and enthusiasts who affect to admire everything foreign, and to despise everything English, pictured the Palace of the Trocadéro as the very arcanum of artistic teaching. Architecture was to have been presented on a scale of magnificence it never before reached, and the *élite* of professional ability was to have been awarded its due honours in a manner France alone could accomplish. Seven medals were to be bestowed upon English architects, and the result, while it has not borne out the expectations of those who believe in the aristocracy of genius, has at least shown the doubtful value to be attached to the official award of medals in art matters, when presidents of institutes and Royal Academicians are competitors for international honours. At any rate, the very safe and prudent plan of giving to him who hath has been followed with this misfortune for the honour of art: one or two gentlemen have been by this rule put last who should have been among the first. Thus, as far as the disposal of reward has gone, in architecture, at least, there has been something like a miscarriage of justice, and the "grande medaille" has again been awarded, not for personal merit, but for title and tact. But there is a broader aspect than the bestowal of medals that concerns us. Have the architecture and art manufactures of the Exhibition reflected credit upon their senders? To answer the question we must carefully compare the criticisms and exhibits themselves, and we have during the last few weeks given our readers exhaustive descriptions of these departments, and illustrated many of the principal works. We are constrained to confess that they all bear an impress of exaggeration and effort. The advertising element is conspicuously prominent. There has been too much of the bazaar, too little of the natural and unstrained expression of true art. We have it on good authority that visitors to the Exhibition are fatigued with the wearisome repetition and multiplicity of some departments, and that the seeker for art is rather more bewildered than gratified. In the English ceramics and furniture the manufacturers have been aiming at mechanical merits, in the desire to surpass other competitors in the number and showiness of their work. Till real art is understood, we must perhaps forgive the mistake of making a large display. It is the vice of all exhibitionary art—if, indeed, any good art is promoted at exhibitions—a proposition many are disposed to question.

In the Architectural Congress the discussion on professional education must be regarded as satisfactory, in at least the proposal of M. Trelat, of the Ecole Spéciale d'Architecture, that scientific and artistic education should go hand in hand. As regards this subject, indeed, there is a concurrence of opinion between French and English architects, that a more systematic education is necessary. One of the difficulties in the payment of architects' services by a regular scale is also felt by our French brethren, particularly that of determining the artistic value of each architect's work, and the Congress recognises the principle of liberty in artistic work, and its free remuneration, based upon supply and demand. We have always thought that the charges of architects would be far more equitable if each member had the right to place his own value upon his services, considered with reference to the principle of supply and demand. Not only would the public gain, but art would be estimated upon its real merit. A specialist in any branch would make his scale in accordance with the demand upon his time, and the crucial test of value would undoubtedly be artistic skill. In our opinion the liberty of action would compensate the art members of the profession for any injury that they might suffer by a diploma which must necessarily place all practitioners on a level of proficiency. Another sign of the times to architects is the unabated conflict going on between the champions of antiquarianism and architectural progress. In the case of St. Alban's roof the contest has even been waged with rancour, and has descended into personalities. Restorationists and anti-restorationists have been engaged in the not very profitable dispute of deciding at what point an old building should be put in a decent state of repair, or rather whether use or antiquity should actuate our interference with it. Upon this question it is not our purpose to say more than we have done. It is satisfactory to observe, however, that the archæologist is not disposed to listen complacently to the anti-restorationist; and the reason to our mind is pretty evident—their interests are not identical. Archæology has for the last half of a century gone hand in hand with architecture—in fact, modern architecture has been the offspring of the former. What was the Classic revival but the natural result of classic archæology, or the Gothic revival but that of mediæval antiquarianism? The "tyranny of archæology," as our American cousins have very appositely called it, has exercised an influence over our architectural taste for good that cannot be questioned. It has saved us from a complete "deadlock," though, at the same time, it has certainly hampered original effort. Even those who vaunt most about their liberty in matters of taste—our Transatlantic friends to wit—have, strangely enough, been reproducing with eagerness the models of classic Italy and mediæval England. In vain we look for originality to those who have been loudest in their protests against the tyranny of style, and the significant question is ever being put, where is original architecture to be found? But it may be worth a passing thought if it is possible for the despotism of antiquarianism to last much longer. There is a cycle in all things, and it may be possible that the dominion of archæology has gone by. The very fact that there is a strong desire to let our old buildings alone seems to presage a change. It certainly occurs to us that a strong feeling for antiquity is inherent in the Englishman, and that archæology is rather a growing than a waning science. Let us walk out into any of our fast-increasing suburbs, where the modern speculative builder holds a dominion of indefinite limits. With what refreshing sense we turn our eyes from the monotonous weariness of the stock-brick villa to any old manor house, with its red brick gables and tiled roofs, nestling in the ancestral foliage of two centuries? How surpassingly pleasant is the glimpse even of a bit of red brickwork with its paned window and white frames. The very sight of long rows and terraces tires, and it is this very longing for a change that increases our zest for old works.

And hence we may remark that while we do not share the opinion of some that the day of archæology is past, we may affirm that her scope for activity has gone by, and that her future efforts would be better employed in husbanding her vast resources, and making them auxiliary to the promotion of architecture. Mr. Waterhouse, in his recent address at Manchester, has spoken so much to the point upon this subject that we may quote his words:—"Manchester being essentially a city of the present, and, let us hope, of the future, the efforts of its architects have, of course, been directed rather to the development of new works than to the restoration or preservation of old ones, and the somewhat fierce and indiscriminating attack on the restorers made by those who would have everything left as it is, has not perhaps much affected many of us personally. It is, however, somewhat interesting to observe that we have perhaps about reached the point of time when restoration, as it has hitherto been understood and practised, may be looked upon as a thing of the past. It has run its course nearly coevally with the career of the great man whose loss we have had recently to deplore, who may be looked upon as the prince of restorers, from the enthusiasm, loving care, and immense knowledge and experience of the probabilities of the past with which his operations were pursued, and from the number of the splendid monuments of mediæval times which were confided to his care." Again we agree with the remark that "most architects, if they be archæological explorers for the greater part of their time, can scarcely be very successful inventors during the remainder; the conservative habit of thought required for their principal occupation has to a certain extent unfitted them for the due performance of their functions as architects." Mr. Waterhouse says truly enough:—"If the purpose and beauty of our buildings were

everything to us, and ancient precedents nothing, I feel quite persuaded that as artists we should not only succeed in designing satisfactory buildings, but they would have a character of their own quite distinct from anything which has gone before them, and we should at length discover that we had—without ever intending it or thinking about it—a new style, a style embracing all the necessities, all the wants and inspirations of our day, but reflecting no picture of the past."

We scarcely need say these opinions are not broached for the first time—we have constantly maintained that archæological study—interesting, and perhaps necessary for the student—should not be allowed to interfere with the actual necessities of the modern architect, and that if every architect, faithful to his own artistic impulses, was controlled by them, we should possess by this time the rudiments of a style to all intents our own. We do not go so far as Mr. Waterhouse in keeping ancient buildings as they are when reparation may make them again useful, nor do we think the painter's or picturesque ideal of preservation the one that commends itself most to the architect. We quite see, however, the absurdity that archæology should stand for architecture any longer, or that architects should still be in the leading-strings of antiquarian teaching. Each has its own field of work to perform, and it is now time that the study of ancient art, whether it be Middle Age, Elizabethan, or Hanoverian, should be regarded as a distinct one, restricted to the work of preservation, comparison, and classification, to the care and watchfulness of old buildings, and not to their resuscitation or reconstruction, nor to interference in works of necessary restoration. The appearance of two hostile camps is a sufficient evidence, we think, that archæology has mistaken its proper function for that of active rebuilding.

THE LOAN COLLECTION OF WORKS OF ART AT THE PARIS EXHIBITION.—III.

WE were prepared to expect a fine display of ancient and illuminated manuscripts, but hardly dreamed that some of the earliest and finest would have come from Great Britain. None of the famous manuscripts in the Trocadéro surpass in interest the three fine books belonging to the library of Rouen. First comes an eleventh-century copy of St. Augustine's exposition of the Psalter, with a fine illumination of the descent of the Holy Ghost; then a wonderful thirteenth-century Psalter, with no less than 15 full folio miniatures; and the finest of all a gorgeous Anglo-Saxon missal (?), written in the eleventh century for the Monastery of St. Swythin, and given to the Abbey of Jumieges by Robert of London, Archbishop of Canterbury, who died in the year 1052. It has 25 great folio pictures, in perfect preservation, in the style of the Æthelwold Benedictional. The Benedictional written at Winchester for Ethelgard, abbot between 977 and 989, is illuminated in a peculiar aqua-tint style. In the same case there is a Psalter, with Anglo-Saxon interlineation of the eighth century. The Ville de Rouen sends some very fine books—a very splendid missal of the use of Rouen of the end of the fourteenth century, given by Richard Percharde for the use of the high altar; a missal of Charles V. and Catharine of England, fifteenth century, of the School of Touraine; a large Bible of the ninth century. Near it is a fine ninth-century Evangelisterium, belonging to the Ville d'Epernay. The interlacing work in the capitals, drawn in gold lined with red, is very effective and good.

The earliest book we noticed is a fragment of Eugippius, the property of M. Desnoyers, who also shows, among other volumes, a lectionary of the eleventh century. The fragment is written in Uncial letters, and is attributed to the seventh or eighth century. We should put it at least a century earlier. The Abbaye de Luxeil is the fortunate possessor of a superb Evangelisterium, by a French scribe of the eleventh century. The book is open at the page where the scribe or owner offers the volume to St. Peter. It bears the inscription:—"Luxovii pastor Gerardus pacis amator; dando Petro librum, lumen mihi posco supernum." The Ville de Troyes exhibits a Psalter, with gloss of the ninth century; a translation of Valerius Maximus of the thirteenth century, containing some of the choicest outline miniatures that we have ever seen, and "Pastorale Sancti Gregorii" of the seventh century written in initial letters. From Rouen we have a "Horæ B. Virginis," by Memling, containing 65 miniatures, one of the gems of the illuminator's art. The great "Missal de Besançon" is a noble volume. So is the great folio translation of "Ovid's Epistles," belonging to the Chamber of Deputies. Their large folio Livy, translated by Pierre Berchoire, is very valuable for costume and drawings of the manners and customs of the French in the fifteenth century. It contains an autograph of Charles V. There are several fine romances, among which Baron Edm. de Rothschild's "Christine de Pisan" is conspicuous. Of the fifteenth century MSS. few surpass in interest and splendour M. de Cloux's glorious "Froissart's Chronicles." It is of the largest size, and full of paintings. In the same case is displayed the famous Bible de Souvigney of the thirteenth century, belonging to the Ville de Moulins. The grand full-page illumination, which is shown, represents incidents in the life of King David. It is divided into four parts. The subjects are his "Slaying the Lion and Bear," "Receiving Arms from Saul," "Killing Goliath," "Taking his Head to Saul."

In the extraordinary and sumptuous collection of M. Amb. Firmin Didot may be seen beautiful specimens of nearly every period of the illuminator's art. His thirteenth century Manducator Historiarum is of the very highest quality. Quite as important is the Commentary upon the Apocalypse of the twelfth century. Two illuminated pages are to be seen representing the fall of Babylon. The city is represented by a grand Saracenic-like building, with horseshoe-arched windows, in flames, the angel standing at right angles along the top of the page, without any thought of natural position. On the opposite page are groups of merchants and kings bewailing the fall of the city.

M. Didot possesses some good Italian manuscripts. A great antiphonarium of the 15th century is very dignified. He is richest in illuminated "Horæ B. Virginis." A very choice one is in the style of the Bedford Missal, with circular medallions introduced into the borders. Two are in the very rare and delicate grisaille style; one is written upon vellum, stained black, the text being white, and the pictures coloured. The treatment is very unusual, but excellent in effect. In a 14th-century psalter there is an illustration of the psalm "Dixit insipiens," almost as amusing as the one in that which was written for Henry the Eighth, where the psalmist is represented by King Harry, playing the harp, and looking very good, while Will Somers, in the background, is making game of him. In the present instance, a Jew, wonderfully drawn, is drinking out of a chalice, and a fool is thrashing him with a rod—the very fool rebuking the Jew for his folly. It will be long before so complete and beautiful a collection of manuscripts is brought together again. Besides the manuscripts there is a fine collection of books and bookbinding, too numerous to specify particularly. Suffice it to say, that among other valuable volumes are several block-books and Caxtons, and a highly-illuminated copy of the great Mazarine Bible of about the year 1450—one of the seven known copies printed on vellum, and lovely specimens of the works of De Tours and other celebrated printers. One manuscript broadside, on a sheet of white vellum, surrounded by an elaborate fringe of silk, is quite new to us. It is a formal document of marriage, which runs as follows:—

In nomine Sanctæ et Individuæ Trinitatis, Patris, Filii, et Spiritus Sancti, ego Franciscus de Paupier, miles et jurium doctor, accipio te, Annam, filiam nobilis Clementis Mulati, quondam jurium doctoris et judicis ressortorum, in uxorem et sponsam meam; et commendo tibi eleemosynas meas sicut Deus dixit et lex Romana confirmavit. Sanctus Paulus scripsit, "Quod Deus conjunxit homo non separet." Datum Lugduni, die xxvii. mensis Iulii, anno Domini millesimo quingentesimo xi.

The period of the Renaissance has ever been a favourite one with choice collectors, and no wonder. It was, indeed, a time of marvellous energy. In the rooms containing the works of art of the 16th and 17th centuries there are enamels by all the celebrated painters at Limoges, the Courtois, the Penicauds, the Limoisins; metal-work, by Benvenuto Cellini; majolica and Hispano-Moresque pottery; faïence of Bernard Palissey; the very rare Henri le Second ware, a great and exhaustive series of every kind of French pottery, cabinets, caskets, Venetian and other glass, astrolabes, and other old philosophical instruments, many of great ingenuity and beauty of workmanship. The watches and clocks are especially worthy of admiration, some having cases set with solid crystal—encrusted with enamels and precious stones—of all sorts of curious and quaint shapes and devices. The cases of MM. Rothschild, Stein, and Seillière are worth a prodigious sum of money. Among the enamels some of the noticeable and important historical portraits strike the eye especially. There are two of Catherine de Medicis, the dress of one of which is ornamented with the monograms of Diana of Poictiers, and her device at the bottom. The monogram is H K K ☾, the moon there also standing for Diana. If these were done with the knowledge of either king or queen they show the curious freedom of the times. M. Rothschild's "Mary Queen of Scots" and "Elizabeth of France, daughter of Henry II.," are fine. There are some splendid dishes of Courtois, with figures *repoussée* before being enamelled. MM. R. and F. Seillière's case contains some of the best portraits—"The "Duc of Nevers," "Francis I.," "Erasmus," and others. Of the work of Leonard Limoisin nothing is finer than the great altar-piece belonging to M. Beurdeley. It is mounted in gilt brass, finely chased, and at the top is a circle inscribed with the name and date 1543—the chief saints, apostles, and prophets are arranged in stages under separate canopies. There is another grand set of the apostles, also by this celebrated artist, executed in 1547, from drawings by Michel Rochetel for Francis I. They are exhibited by the Ville de Chartres, and are of unusually large size, wonderfully bold and fine. By the Courtois we have many excellent dishes painted with their usual force and richness of colour and ornamentation, forming a pleasant contrast, with the quieter and more classical, but not less beautiful productions of the Penicauds. M. Seillière shows a most interesting piece of the latter

work. It is a crucifixion, painted in grisaille, the figures having been hammered out in relief previous to the enamelling. The last article we shall mention in which enamel is used belongs to Baron Rothschild. It is a very fine coffer of jasper, mounted in silver gilt or gold, exquisitely enriched with translucent enamel, made in memory of Pope Sistus II., whose kneeling figure, in full pontificals, is placed upon the top of the lid. It is one of the gems of the cinquecento period, of great perfection and beauty.

LIGHTNING CONDUCTORS AND PROTECTION OF BUILDINGS.

THE value of lightning conductors as a protection to our buildings has not been recognised as it should have been. Mr. R. Anderson, F.R.S., in a paper read at the British Association and reported in the BUILDING NEWS, informs us that at least one-half of our public buildings are without this security, while the application of the conductor to private houses is quite the exception. The Registrar-General, in his report of 1878, says the number of deaths from lightning in England and Wales was 182 from 1869 to 1876; and it is estimated that over a hundred lives are sacrificed annually from this one cause. The recent severe thunderstorms that have visited Great Britain, and the amount of destruction that has thereby accrued to buildings, afford ample apology for referring now to the subject. In the first place the negligence in providing so essential a safeguard to our buildings is more culpable when we consider the small cost of furnishing the means of protection, and the loss of life that would be averted. It is astonishing that such a cathedral as Peterborough is destitute of a lightning conductor, though this is only one of our numerous public edifices that are without so simple an expedient. Argument is not necessary to convince the guardians of our public buildings of the gross neglect of not providing so sure a means of protection. It appears, however, that where lightning conductors are fixed we have no evidence of their efficiency, and this point leads us to consider the importance of the employment of competent persons to undertake their fixing. There is, moreover, an immense deal of ignorance of the theory of the electric current, also of the position, mode of fixing, and "earth connection" of the conductor, to give it its maximum degree of efficiency. In hundreds of cases where conductors provided they become little better, as Mr. Anderson observes, than a "delusion and a snare." They are placed in positions where they are of little use, their insulation is not perfect, they become damaged, or their connection with the earth is imperfect. Mr. Anderson's paper does not give any information on these points, and we may therefore say that a lightning conductor consists of a conical rod overtopping the building, the principal portion called the conductor proper connecting the rod with the part which runs into the ground. The rod is usually pointed, of iron or copper, and gilt to prevent oxidation. The conductor may be round or flat in section, though the former is preferable, and is made either of iron or copper; when the latter is used it may be in the form of copper-rope or wire, though probably the best conductor to resist the effects of the weather is an iron rod, galvanised, about ¾in. diameter. The French Commission which sat in 1823 gave as the minimum section for an iron conductor a square of 15 millimetres as sufficient under all circumstances. Of course copper being a better conductor of electricity needs a much less section than this. In the fixing of the conductor a great many errors are committed—for example, we have seen them fixed near rain-water stacks, close to iron eaves and window frames, roofs of metal, and chimney stacks, ignorantly of the fact that any of these things may readily divert the electric current in its passage to the earth, for even foul flues are well known to be good conductors of electricity, and numerous accidents have arisen from the discharge taking place down a sooty flue to the metal grate below. Any kind of conducting material in the immediate neighbourhood of a conductor is liable to impede or divert the electric discharge unless the rod be properly insulated or made part of such masses of conducting material by connecting them. Indeed, it is desirable to place the eaves spouting and stack-pipes in connection with the conductor to insure safety. Coming to the "earth connection," it may be observed that the efficacy of hundreds of conductors is injured by not providing for the ready dispersion of the electric force in the ground below. Moist earth is indispensable, Mr. Anderson says, and he is sceptical as to whether the few rods which stand over the royal apartments at Windsor Castle have their root in moist earth. But as the lightning current must have a metal path provided for it to the earth it is necessary that the earth should be made as good a conductor as possible. Dry earth is worse than useless, and if possible a conductor should end in a well of water. If this cannot be had it may be led to a near water-course in a drain filled with charcoal, or into a deep hole filled with the same material. Mr. Anderson instances the case of a mansion near Kew "Clayponds," where the conductor had a dry earth connection, and the electric force, not finding a ready path to the earth, struck the top of a large chimney, knocked off the coping, and lifted up marble toilet tables before it made its way to the earth. Now the remedies for these defects are simple enough, as we have shown. Besides attention to the points we have alluded to, which the employment of a competent electrician would have insured, it is absolutely necessary to the continued efficiency of lightning conductors that they be mantained in good condition. As Mr. Anderson rightly remarks, "a lightning conductor is worth nothing unless it is periodically tested." The testing should take place at regular intervals before the recurrence of summer thunderstorms, and competent inspectors, provided with galvanometers, ought to be appointed to make periodical visits to all buildings so protected, or which have undergone alterations that may have impaired the insulation or earth connection of the conductors. In France and Germany a system of inspection already exists. The same writer hints that though the Houses of Parliament are provided with several conductors they have never been tested, and there is no guarantee that a discharge of lightning may not at any time strike the Throne, the Lord Chancellor's woolsack, or the Speaker's chair.

The radius of protection afforded by a conductor is not alluded to in the paper we have referred to, and considerable doubt exists among scientific men upon the point. To take a large irregular building like the Houses of Parliament, the towers at each end, and probably the central spirelet, ought to be furnished with conductors, but it would be useless to place them on the smaller masses or roofs. It may be imagined that the point of a conductor becomes the apex of a cone, within which all other points of a building are exempt from a lightning discharge; and some authorities have asserted the limits of the protection afforded by a conductor extend to a distance of twice its height. It is sufficient to observe, however, here that the conductors of a large building should be brought into connection. The protection of ordinary dwellings should not be overlooked, and the simplest and least costly method of guarding every house against the destructive visitation of the electric discharge is that recommended by Mr. Preece, the well-known electrician, to afford the lightning a safe path along the line of least resistance by connecting the iron grates of a house and eaves guttering by iron or copper wire, and allowing the current a free discharge in the earth by connection with the street water-pipes or otherwise. If every street or terrace of houses had a conductor at proper intervals, and if all our public edifices were provided with them, and their efficiency and testing were under the control of the local authorities, we should not hear of the unfortunate casualties we now do in our towns at every recurrence of a thunderstorm in our midst.

THE FATAL FALL OF AN ARCHWAY IN BISHOPSGATE.

IT is difficult to conjecture the cause of a calamity like that which occurred in Bishopsgate last week, and recorded in "Our Office Table," resulting in the loss of two lives, in the face of such conflicting elements of mischief as a severe thunderstorm, accompanied by an electric discharge, and the overloading of an arch newly erected and saturated with rain. We would, in fact, rather defer giving an opinion till all the facts are before us. Unfortunately, however, so complete a wreck was made that the jury empanelled to investigate the cause and to view the scene of the accident were unable to arrive at any conclusive evidence that pointed to either of the above suppositions, and have brought in a verdict of "accidental death," attributing, however, the accident to the storm. This was of course an assumption based on probability. A personal inspection of the building has enabled us to form some idea of the conditions of stability of the archway, and we may briefly state our conviction that the mishap was one for which it would be difficult to impute any direct blame. In the absence of facts and particulars as to the mode of failure and the quality of materials we are unable to form any satisfactory hypothesis. We cannot proceed inductively; we can only reason from our knowledge of the general conditions of stability and the proportions necessary to insure the same—we have, in fact, to take a certain mode of construction into consideration, and from *à priori* reasoning to infer a probable cause of failure. But let us briefly describe the structure. The fallen archway formed a corridor in the basement of a new building to be let out in offices, now building in Alderman's-walk, Bishopsgate, by Mr. Deputy Brass, builder. It was about 20ft. in length, 7ft. 6in. wide, and about 9ft. high. The side wall which fell and caused the disaster was 18in. at the base and 14in. above, there being a set-off to the latter thickness. It supported at the top a series of iron girders or joists, which formed part of the ground flooring, but was unsupported by any lateral walls. The arch was a flat segment of half a brick in cement, resting upon ordinary framework, and was filled in on the previous Tuesday with cement, upon which a quantity of ballast had been thrown for the purpose of forming the floor to the upper corridor. One witness said there were eight loads of ballast placed on the arch on Saturday, though ballast had been deposited previously. G. Williams, a labourer, it appears from the evidence, pointed out to the foreman a flaw in the wall on Friday, but was told to mind his own business. He also gave evidence as to the bad quality of the lime. On Saturday last the unfortunate men, Colley and Higgins, took shelter beneath the archway during the great thunderstorm, when a

severe flash of lightning, followed by a loud clap of thunder took place, immediately upon which the arch fell in upon the men. The evidence of a scaffolder, A. M. Baynard, and the foreman of carpenters did not throw any light upon the cause of accident, though they both agreed that the heavy rain had increased the weight of loose ballast upon the arch which was run along in barrows upon planks, and tipped upon the arch. It measured 2ft. 6in. thick. G. Kerry, the foreman, attributed the fall to a sudden shock from the thunderclap, which caused a vibration, and the wall to bulge. Mr. Thomas R. Turner, foreman to the builder, said he prepared the plans, and believed the cause to have been the lightning striking one of the iron columns the force passing down till it reached the wall, causing it to give way. Williams, a labourer, attributed the fall to the weight of ballast forcing the arch out, and to the badness of the lime, owing to exposure to weather. In the resumed evidence on Tuesday last, Mr. Wood Thorpe, the surveyor to the Corporation for the Northern Division, said that he had approved of the plans and sections submitted to him, and from examination of the *débris* thought it probable one of the iron columns had been struck by lightning, which had then come in contact with the opposite wall, forcing it down, and thus letting the arch fall in. The same witness affirmed the materials were of the best kind, and generally approved of the work done.

Such then is the verdict and the nature of the evidence submitted. While we have no desire to impute negligence to any one, the accident is of a kind that calls for notice. Here was a long and rather thin wall 9ft. high, and only 14in. thick; upon it a flat arch abutted, 7ft. wide, for a considerable distance. It is true there were iron joists running into it at right angles, but the question is whether they really steadied the wall, and assisted as an abutment or not. Above was a row of cast-iron pillars. It is very possible the lightning struck one of these or the girder, the electric force coming in contact with the wall supporting the arch and causing a rent. On the other hand, there is the possibility that the girders had somewhat shaken the wall in question, which was by no means a stout one; while the flat arch abutting against it at the top, and loaded with ballast not spread, but tipped on one side, and saturated with the rain so that its weight was considerably augmented, and probably started by the thunderclap, suddenly exerted a thrust that pushed out the wall, and led to the fatal accident. This supposition is strengthened by the fact that the ballast had been lately thrown on, and the sudden rainfall had largely increased its load at a certain point of the arch. The other side wall being firmer, and supported by the iron stanchions and partition walls could not yield, and the whole thrust was thrown upon the unsupported wall. Again, we notice that a portion of the same arch abutting against the walls at the entrance to corridor has not fallen; but the reason is clear—namely, the side walls here are laterally supported by cross walls besides the girders, which appear to have been fixed some time. Though the arch is said to have been set in cement, it is very doubtful whether it had really set, and it is very probable the unsupported length of walling against which the girders abutted had been slightly shaken. We venture the above supposition, not with the idea of weakening the verdict, but to show the failure might have been attributed to another cause. At any rate, the lessons to be drawn are obvious, and show the necessity of attention to certain precautions, the treacherous character of arches when loaded, and their danger when exposed to heavy rains, and, further, the importance of building massively and well, and of providing against such a casualty as a heavy thunderstorm where iron is employed.

FOREIGN GLASS AT THE PARIS EXHIBITION.

THE comparatively small number of foreign contributors, and notably the absence of German glass, renders it impossible to assign to England any definite international position in the glass trade. There are, however, sufficient materials to prove that the excessive cost of manufacture in England prevents her competing for the sale of the commoner forms of blown glass, and that her present celebrity for the purity and brilliancy of her metal is not likely to remain undisputed. Realising the position in which they are placed, English manufacturers are struggling after originality and startling effects. In some cases the results are good; but a glance at Messrs. Webb's large, varied, and costly display will show that, in this very struggle for originality, there is some risk of true beauty and elegance being sacrificed to vulgarity of taste and a craving for loudness of colour. France, Austria, Hungary, Belgium, Italy, and Spain are represented at the Exhibition. Spain only contributes a few jugs and bottles of extraordinary forms, and of rough and discoloured metal, which probably might be bought cheap, and sold, if not detected, as rare antiquities.

Hungary and Belgium show common glass ware, poor both in design and colour. France makes an imposing spectacle, but has little that is new or interesting. The Baccarat display is painfully monotonous, and is grouped round a glass pagoda of doubtful beauty. The gem of the collection is a complete set of cut glass, with small and delicate ruby shields, containing monograms, engraved through the ruby on to the flint beneath. Some curious enamel-painted vessels of Oriental appearance, by Rousseau, enamelled Arab lamps by Pfulb, the sparkling avanturine and the bronze glass of De Pantin, all deserve notice.

The St. Gobaire Company shows a huge sheet of plate glass, and one of the bottle manufacturers offers a puzzle to the curious in some wine bottles, with narrow necks, containing tumblers or smaller bottles, instead of the juice of the vine. La Société Anonyme du Verre Trempé, in addition to wine-glasses, tumblers, bottles, and sheet-glass, exhibits some vessels for laboratory use, for which this glass may be really useful. Austria is ably represented by the firm of Lobmeyr. At their stand we find iridescent glass in every form, and iridescence blended with every other kind of ornament. Here we see enamel-painting in perfection, one set of black scrollwork on flint being beyond praise. Here also are the well-known dark-green beakers, with bright enamel-painted coats of arms; and vases and vessels of varied colour and shape, glistening with brilliant scales of gold and silver. Italian or rather Venetian glass is so well known in England as hardly to require special notice. The stands of Salviati, and of the Venice and Murano Glass Company, are side by side, and form a pleasing object. The eye is first attracted to chandeliers in opal and flint-glass of surpassing beauty, and is then bewildered by a profusion and endless variety of shapes and colours. As curiosities the reproductions of early Christian glass, by the Venice and Murano Company, deserve to be carefully examined. In these gold-leaf, etched with figures and inscriptions, is incorporated in vessels of various forms. So completely have the Italians acquired mastery over, and knowledge of, the material with which they deal, so varied are their productions, and so well is their work represented at the Exhibition, that a careful scrutiny of these two stands, and the consequent study of the the beauties and failings of Venetian art, will suggest the legitimate lines to be pursued, and the limits which should not be passed in the production of ornamental glassware suited to the refined taste of the present day. The weak points in Venetian work, for Venetian glass is far from being perfect, are elaboration of detail and absence of utility. Increased labour does not mean increased beauty. The eye may, for a time, be dazzled by intricacy of designed skilfulness of execution; it can only find true pleasure in simplicity and truth of form, and in the harmony between the material and the work bestowed upon it. These considerations are especially necessary at the present time, when Messrs. Jenkinson are, with consummate skill, imitating all the twists, turns, and failings of Venetian handicraft, and Messrs. Webb and Messrs. Hodgetts and Richardson are producing glass cameos of excessive beauty, but in which the labour of many years may be reduced to powder in a single second. If English manufacturers wish to excel in the production of ornamental glass, they must study their material. They must consider the brilliancy of glass, its power of assuming every tone of colour, and, above all, its fragility. They must give up servile imitation, and strike out a new school in which utility and simplicity, truth and elegance are recognised as the cardinal virtues.

THORNEY ABBEY.*

IT may be almost said that Thorney Abbey, as such, has disappeared; the only present remains of it being a small portion of the conventual church—that is to say, the west end of the nave, with its five western bays. It is a matter for congratulation that what is left of the ancient building is still applied to the purpose of the worship of Almighty God. In many cases these venerable fanes exist only as ghastly ruins, in others they have been appropriated as farm-steads; sometimes the cloister garth is turned into a fold-yard, the kitchen and refectory into piggeries, the chapter-house into cart-sheds or cow-houses, whilst perhaps a common highway traverses the eastern altars.

A "clean sweep" of rather unusual character has been made of the conventual buildings at Thorney, which, according to recent history, would seem to have been a magnificent establishment. It is difficult to understand how the numerous graves which have been dug within the area of the church itself (assuming that it was ever finished according to the indication of the present remains) could have been sunk amidst the immense foundations which must have existed below the present surface, without great obstruction; yet nothing, so far as my inquiry goes, can be learnt on this point.

To turn now to the west end of the church. Taking the somewhat ostentatious figures, 1638, which appear in the spandrels on each side the doorway, to mean something (though it has been suggested that they record the removal of the aisles of the church, which would be a liberty something like that of making use of another man's tombstone) there are at least three periods of work in this front—1st, the Norman, as seen in the main parts of the flanking turrets; 2nd, late Perpendicular, including the octagonal portions of the turrets (except the lowest course of them, which is Norman), the top screen wall, with its nine niches and figures, the jambs and arch of the large window, now blocked up, the panelling on each side the doorway, and, in my opinion, the jambs of the doorway itself. This leaves for the date 1638 the present five-light

* A paper read by CHARLES LYNAM, of Stoke-on-Trent, before the British Archæological Association, Aug. 23, 1878 (see p. 224 in last issue).

window, the outer arch of the doorway, and the spandrels, most of the cornice which runs above it, together with a few fragments of the upper parts of the side panellings, and the inner doorway. This statement of what belongs to the date 1638 may be debated, but a careful examination of the details will, I think, lead to the conclusion above mentioned. No one looking carefully at these features will fail to see their difference of character, as compared with the other Perpendicular work: the mouldings are very late, and the carving corresponds with the given date. The upper parts of the turrets and niches were, no doubt, erected before the dissolution, whilst the monks were in occupation. It is said that the figures represent Saxon saints, but in their present state it is difficult to distinguish them. The centre figure contrasts with the others in that the upper part of the body and the legs are not clothed, whilst the bare right hand is uplifted, with the two forefingers erect, as in the act of benediction; in the left hand the long staff of what was probably a cross remains. The next figure to the north has a long staff in the right hand and a closed book in the left. The corresponding one on the south bears a sceptre in the right hand and a closed book in the left. The emblems borne by the second figure from the centre to the north are very indistinct; the corresponding one to the south holds a ship with both hands; the third in the north has an open book in the right hand; its fellow on the south has a staff in the right hand; the end one on the north has a battle-axe on the right side; the south end figure is too much weather-worn to be distinguished. A deep hole is sunk at each of the armpits in all the figures except that in the centre, and there are indications of the open wound in the right side of the centre figure, which would show it to be that of Christ after his resurrection.

The Norman portion of this front is thoroughly characteristic of that period. Its boldness of dimension, simplicity of detail, the smallness of the stones of the masonry, and the form and minuteness of the turret windows, all exemplify its identity with that period.

Proceeding to the north flank we find five bays of the Norman nave arcade, surmounted by the arches of the triforium, with buttresses between. The arcades of nave and triforium have been filled in with walling and windows of late date, probably corresponding with the latest portion of the west front of the time the church after the Dissolution was again adapted for worship. The triforium has been surmounted by an embattled parapet and cornice beneath it, all of the same date. This would also fix the date of the present roof of nave. Looking at the great arch in the west wall, and at the height of the screen wall, it is a matter of conjecture how the church was roofed when the Perpendicular portions of the west end were put in, but it would seem to have been a flat roof, otherwise it would overtop even the height of the present screen wall. It will be observed that next the west end one panel of the Norman clerestory still remains, with the double billet moulding running round it. Also an inner opening into the triforium, now blocked up. The passage within the clerestory wall is also visible, together with the west respond jamb of its inner opening. It will also be observed that the external joint of the clerestory window still remains, but this is of late work, probably not older than the turrets of the western front. Whether the whole clerestory has been rebuilt at this date there is nothing now to show. It is not very clear what was the line of the west wall of the aisles unless the blocked-up opening on the level of the triforium gives it. The nave piers vary alternately in design, the arches on this side being simply square, without moulding or other enrichment. There are various odd bits of very delicate carving on the caps and bases of these piers, and the two eastern arches of the triforium are moulded, and a start is made of a similar moulding on the western side of the third bay. This points to the mouldings being executed after the work was fixed. In this way the masons would press forward their structure, and at any time afterwards add to its beauty and enrichment.

The eastern part of the church is new, and therefore does not concern us archæologically. Passing to the south side we find the five Norman bays corresponding with those on the north, excepting that the mouldings in the triforium arches of the eastern bays are absent, and that there is less carving generally. Again, on this side at the west end a Norman clerestory wall panel remains, but it is plain moulded, without the billets, whilst the triforium opening now blocked up has the billets here, being plain on the north side. Here again is an external jamb of the western clerestory window, and the internal jamb shaft corresponding exactly with the north side. There is also a small fragment of much interest, as it is the only one which remains—namely, the western corbel of the great cornice, which fixes the exact height of the start of the Norman parapet. The lower part of the stair turret here, as on the north side, is of late work, the Norman face being indicated by a straight joint in the masonry.

Having viewed what remains on the outside of this once magnificent church we may now pass to the interior. The ceiling is of modern construction. The arcade of the nave follows what is seen of it on the outside, but the arches are moulded, and the triforium is treated in a more ornate manner. Looking at the grandeur of proportion and simplicity of detail of this arcade I venture to say it could hardly be surpassed as a piece of ecclesiastical architecture. At the west end the large blocked-up opening which is visible on the outside may be seen here, as well as the Norman remains in the angles. This wall was almost entirely taken out at the time of the first alteration at the west end, as is shown by the straight joints in the angles, but the Norman shaft and arch forming the inner angles of the present window have been re-used when this window was put in. There is one bell in the north-west tower which bears date 1740.

There are some remains of late German glass in the eastern windows on the north and south sides of the nave. In the north wall is a mural brass of the date 1674, of which I show a rubbing. It is of some interest as the inscription translated by Mr. Walford shows, and is as follows:—

MEMORIÆ SACRUM

Venerandi Senis, Ezechielis Danois, compendiensis Galli cœtus Gallici, qui hic congregari cœpit, anno Domini MDCLII. Pastoris primi, qui studio indefesso, doctrinâ, et severitate morum nulli secundus, ingens literaturæ thesaurus, hic orbem latuit, Deo, sibi, paucis aliis notus, eisque contentus testibus, per liv. annorum spatium, ex quibus xxii. hic Thorney Abbatiæ, summo cum fructu, ministerio suo functus, tandem hic ubi laboris ibi et quietis locum invenit. Obiit 24 Feb., A.D. MCDLXXIV. Ætatis —.

SACRED TO THE MEMORY

Of the venerable man, Ezekiel Danois, a Frenchman, of Compiegne, and first pastor of the French Congregation, which began to assemble here in the year 1652, who, second to none in unwearied zeal, in learning, and in severity of character, and a huge store-house of learning, here escaped the notice of the world, and known only to God, to himself, and few others, and content with them as witnesses, discharged for the space of 54 years (out of which he was profitaby Abbot of Thorney for 22 years), and at length here, where he had found a place of labour, found a place of rest. He died Feb. 24, 1674, in the — year of his age.

Of the present interior it may be faithfully said that it has a neat and clean appearance, and a local historian has remarked of the present church:—"Possibly the pious wishes of the original founders are being better fulfilled than if the stately fabric had been permitted to remain in the pride of its monastic splendour." For my part I think it would be difficult for a Norman Benedictine monk to realise this most respectable-looking building, with its yellow-washed walls, plaster ceiling, high side pews, and central open benches, and the significant arrangements for the offices of the officiating ministers, as the place where the gorgeous functions of his order were in any way being continued.

STEEL FOR STRUCTURAL PURPOSES.

THE final report of the committee of the British Association on the use of steel for structural purposes states:—"Having given the subject our best consideration we recommend that the employment of steel in engineering structures should be authorised by the Board of Trade under the following conditions, namely—1. That the steel employed should be cast steel, or steel made by some process of fusion, subsequently rolled or hammered, and that it should be of a quality possessing considerable toughness and ductility, and that a certificate to the effect that the steel is of this description and quality should be forwarded to the Board of Trade by the engineer responsible for the structure. 2. That the greatest load which can be brought upon the bridge or structure, added to the weight of the superstructure, should not produce a greater strain in any part than 6½ tons per square inch. In conclusion we have to remark that in recommending a coefficient of 6½ tons per square inch for the employment of steel in railway structures generally, we are aware that cases may, and probably will, arise when it will be proposed to use steel of special make and still greater tenacity, and when a higher coefficient might be permissible, but we think those cases must be left for consideration when they arise, and that a higher coefficient may be then allowed in those instances where the reasons given appear to the Board of Trade to justify it." This report has since been acted upon by the Board of Trade in the printed paper issued by them in reference to railway structures. "It will be observed that a coefficient of 6½ tons per square inch is assigned to steel, that of iron being 6 tons per square inch. This increase of the coefficient will effect important economy in structures, especially in bridges of large spans, and will also tend generally to increase the employment of steel for railway and shipbuilding purposes. The labours of your committee having ended in such a satisfactory manner there is no necessity to re-appoint them."

CHIPS.

A new temperance hall has been opened at Louth, Lincolnshire. Mr. J. Thompson is the architect.

By a clause in the Public Health Act of 1875, which will come into operation next March, rural sanitary authorities will be vested with increased powers with regard to water supply. After that time intending builders, in addition to submitting plans of their buildings and showing the drainage, will have to show how a water supply was to be procured, and if necessary they will have to sink a well for this purpose before the plans are passed.

The general manager, the engineer, and some of the leading officials of the Great Eastern Railway, have visited Newport, Monmouthshire, with Mr. Abernethy, C.E., in order to inspect the Newport Alexandra Docks, and especially the new graving dock, works of a somewhat similar character being contemplated at Harwich.

New waterworks have been constructed for the district of Cowpen, near Newcastle-on-Tyne, by Mr. Dodds, contractor, of Durham.

Mr. A. Robinson, late surveyor of Newtown, Mon., was last week elected surveyor to the Local Board of Ashford, Kent, at a salary of £150 a year.

A large hydropathic establishment is in course of erection on the hillside at Kilmalcolm, near Greenock, from the designs of Mr. Thos. L. Watson, of Glasgow.

A committee of the Stoke-on-Trent Town Council has recommended that legal proceedings shall be taken against the Stafford Potteries Waterworks Company for supplying water unfit for drinking purposes.

Magdalen Hospital Charity Chapel, at Holloway, near Bath, was re-opened on Friday, after restoration. The alterations, which have been carried out by Messrs. Hayward and Wooster, completely renovate the interior of the chapel, and the building has been reseated. The cost has been about £500.

The Belper rural sanitary authority have decided to borrow the sum of £2,380, for the purpose of carrying out a scheme for the supply of water to Shirland and Higham.

On the 22nd ult. the memorial stones of a new Wesleyan Chapel at Cottingham, near Kettering, were laid. The chapel is to be 33ft. in length by 20ft. wide, and to accommodate 250 persons. Mr. Payne, of Kettering, is the architect, and Mr. Crisp, of Market Harborough, the builder.

The village of Comrie, N.B., is about to be drained and supplied with water from plans prepared by Mr. Ritchie, C.E., of Perth. The total cost is estimated at £2,400.

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ILLUSTRATIONS.

DESIGN FOR NEW TOWN HALL, GREAT YARMOUTH—WINCHELSEA CHURCH—NEW BANK AT SALISBURY—NEW TOWER TO ST. FRIDESWIDE'S, OSNEY, OXFORD—BRACKET CLOCK.

OUR LITHOGRAPHIC ILLUSTRATIONS.

WINCHELSEA CHURCH, SUSSEX.

WINCHELSEA CHURCH was erected between the years 1288 and 1292, and appears to have been originally a very imposing structure, consisting of a nave and chancel, north and south aisles, and a central tower. Only the eastern portion of the original building, consisting of chancel and side aisles, now remains. The interior of the building, contains some very beautiful canopied tombs, erected to the memories of Gervase and Stephen Alard, admirals of the Cinque Ports. A geometrical drawing of these tombs appeared in the BUILDING NEWS for February 9, 1877.

BRACKET CLOCK.

THIS clock case was one of a few which were designed by Mr. Thomas Harris, architect, of Gray's-inn-chambers, High Holborn, for Messrs. Howell and James. It is of walnut, and was executed by Mr. Robinson, of High Holborn. The panel and dial plaques were painted by Mr. Smith, of the firm of Campbell and Smith, of Southampton-row.

NEW BANK AT SALISBURY.

THE illustration shows the banking premises now erecting at Salisbury for Messrs. Pinckney Brothers. The building is constructed with Fareham red bricks and Bath stone dressings. The timber-work is of oak, with incised plaster in the panels. The banking-room is 20ft. high, and is lighted by the large bay window, which will be partly filled with stained glass illustrating some of the guilds for which Salisbury was formerly celebrated. The remainder of the ground floor is appropriated to the clerks and private rooms; a large strong-room and book-rooms are also on this floor. The upper part contains the residence of the manager. The works are now being carried out by Messrs. Hale and Sons, of Salisbury, under the direction of Mr. Henry Hall, architect, of 19, Doughty-street, Mecklenburg-square, London.

ST. FRIDESWIDE'S, OSNEY, OXFORD.

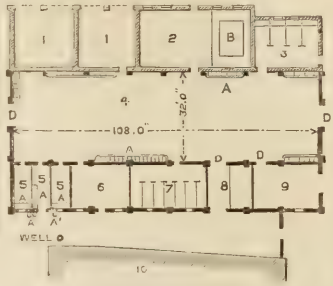
THE illustration shows the proposed design for the completion of the tower of this church, which was built some few years since by the late Mr. Teulon. There is at present a temporary roof on the string-course immediately above the chancel, and it is proposed to add a ringing chamber and belfry. The architect is Mr. H. G. W. Drinkwater, of Oxford, from whose plans the vicarage on the south side has recently been erected.

YARMOUTH TOWN HALL.

THE design which we illustrate to-day was that submitted under the motto of "B" in a triangle by Mr. E. F. Bisshopp, architect, of Ipswich. Last week we published illustrations of the second premiated design, by Messrs. Nattress and Sedger, and shortly we hope to give drawings of the other premiated designs. Mr. Bisshopp's design is one which we favourably remarked upon in our review of the whole series, published in the BUILDING NEWS for July 5th (p. 1 *ante*), so that little remains to be said here. Both the principal plans, with a general view and the main elevations, are given, and these will speak for themselves. A rather free but simple treatment of English Renaissance of the 17th century was adopted, on account of expense on the one hand, with suitability to the site and surroundings on the other. Stone was shown for the facing of the external walls, in obedience to an expressed preference on behalf of the building committee for that material, but red brick, with stone dressings, was recommended, and the estimated cost of £24,000 was guaranteed by a well-known local builder for the execution of this design within 10 per cent., and exclusive of fittings.

FARM PLANS.

HAVING found great difficulty in finding any modern book treating on farm building, or illustrations in any of the professional journals, including the BUILDING NEWS, which I have now taken regularly for six years, I send the enclosed plan. The farm has been in full working order for some little time now, and in every respect is found a great success—although, being an old farm remodelled, it is not exactly after the fashion of the many model farms now working on the same system in Yorkshire. The cattle are turned into the fold-yard as yearlings in the autumn, where they remain always under cover till the spring, when they are sold in the York Cattle Market,



REFERENCES TO PLAN.

1. Cart sheds, with barn over.
2. Fodder-cutting and storing-house, with barn over.
3. Stable.
4. Fold-yard.
5. Piggery.
6. Cart-house.
7. Cow-house.
8. Passage, poultry-roos over.
9. Implement-house.
10. Farmhouse.

A. Feeding troughs.
A'. Food shoots.
B. Fodder-cutting machine.
C. Coals.
D. Sliding door.

bringing in a large profit to the farmer. Sometimes, if a disease gets among the cattle, there is found the only disadvantage of this very new system of cattle-breeding, which is making the fortune of many farmers in the neighbourhood. A small acreage only is required. Eighty-five acres work the inclosed buildings, and upon those 85 acres is grown everything necessary to feed the cattle, together with a large surplus. Of course an immense quantity of manure is obtained every spring, which is enough to manure a much larger farm in a more complete manner than is usually the case with the old-fashioned system. Twenty-five yearlings were fattened in this building last winter. In the centre of the fold-yard is usually a large cess-pool for keeping the manure dry and well drained. (Upon my plan I do not show the drains, in order to avoid confusion.) The cattle are fed upon very small (machine) cut straw and turnips.

ARTHUR B. PLUMMER.

On page 210, 1st column, in last issue, the names of the authors of the second premiated design for Yarmouth Town Hall should be Messrs. Nattress and Sedger, as in the accompanying illustration.

The High Wycombe Town Council have decided to carry out a system of land purification of the sewage of the town.

TRURO CATHEDRAL.

A MEETING of the general committee appointed to carry out the preliminaries for building a cathedral for the new diocese of Truro was held in Bishop Phillpott's Library, Truro, on Thursday in last week. The Earl of Mount Edgecumbe presided, and in detailing the mode in which the recent competition between selected architects was conducted, mentioned that the majority for Mr. Pearson in the final voting was 7 to 4 for Messrs. Bodley and Garner. He urged the importance of simplicity of design, and that the material ought to be granite. The executive committee presented the following report:—

"After a careful examination of the drawings sent in by Messrs. St. Aubyn, Bodley and Garner, Burges, Pearson, Pullan, J. O. Scott and Street, the executive committee selected by voting Mr. Pearson and Mr. Bodley for recommendation to the general committee. Upon a second voting Mr. Pearson was placed first and Messrs. Bodley second. The executive committee therefore beg to recommend Mr. Pearson as the architect of the new cathedral. They desire to express their thanks to the eminent architects who have kindly allowed them to see drawings of their works, and especially to Mr. St. Aubyn, Mr. Bodley, and Mr. Pullan, for having prepared drawings expressly with a view to the erection of a cathedral at Truro. The committee have to add that to-day they have seen a design and drawings by Mr. J. M. Brydon, who had received permission to send in drawings with the seven exhibiting architects, but who by accident was misinformed of the date of inspection, and they beg to state that, whilst expressing as they do their thanks to Mr. Brydon for his labour and skill as shown in his design, they beg to assure him that inasmuch as their original selection has been adhered to he has not been prejudiced by the circumstance of the delay in the delivery of the drawings."

An adjournment having been made to the council-chamber to examine the plans, the report was adopted.

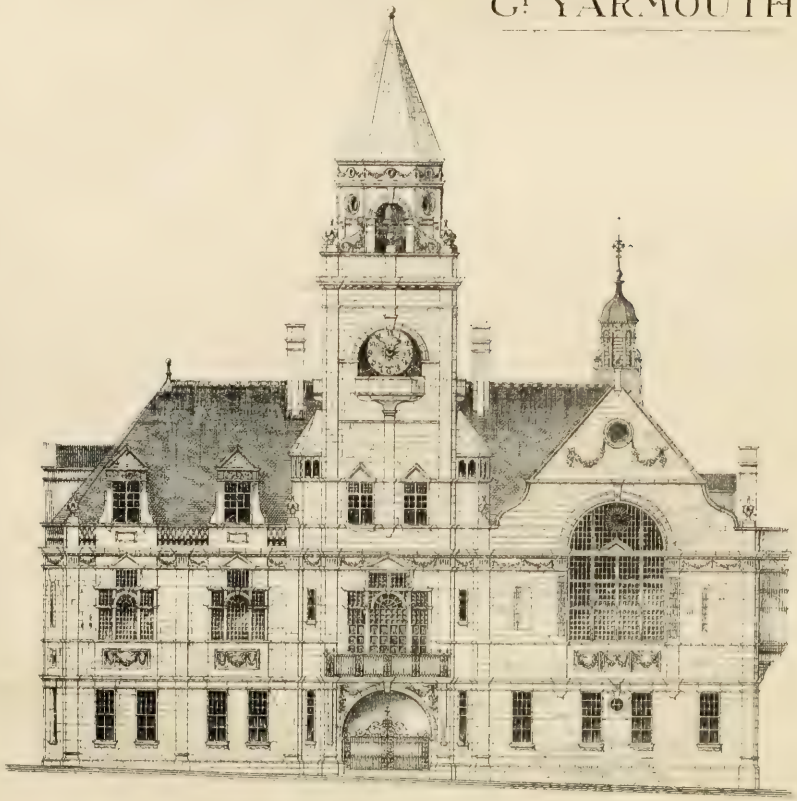
A letter was read from Mr. R. P. Pullan, saying that in consequence of his designs being executed while travelling, he did not expect they would be selected, and congratulating the committee upon their choice of one of the first ecclesiastical architects of the day. The Mayor of Truro reported that all the persons interested in the building on the south sides of the cathedral approve of the erection of the new cathedral on the site determined on, and consent to any obstruction of light to their property which may necessarily be caused by such erection. They are willing to enter into an agreement giving an effect to such consent. As to the property on the north, the owners have consented to sell the same, and the total cost will be about £10,000. The executive committee was authorised to complete the purchase as funds were forthcoming. It was announced that the subscriptions up to the present, exclusive of the sum promised towards the restoration of St. Mary's Church, now being used as a pro-cathedral, and the site of which will be utilised for the new cathedral, amounted to £26,197.

The memorial stone of a new burgh school at Haddington, to be known as the John Knox Memorial Institute, was laid on Saturday. The style of the buildings, which form a parallelogram on plan, is Early English, a prominent feature being the central tower, 14ft. square, and 80ft. high. On the chief face of this tower is a canopied niche, in which a full length figure of Knox will be placed. Mr. Starforth, of Edinburgh, is the architect, and Mr. Thos. Ormston, the builder. The total cost is £9,000.

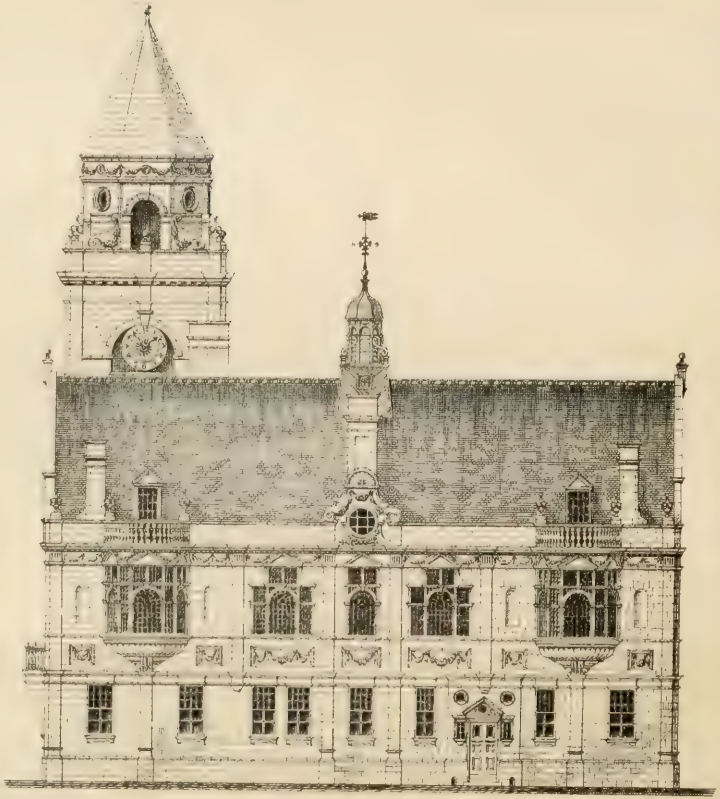
The foundation stone of a new Welsh Wesleyan chapel, to be erected at Hirael, the seafaring quarter of Bangor, was placed on Monday week. The style is Italian, the external dimensions being 46 by 37ft. It will be built of stone and brick, cemented over and dashed with grey spar. Accommodation will be provided for 330 worshippers on ground floor and side galleries. The joinery is to be pitch pine varnished. The designs have been furnished by Mr. Richard Davies, Bangor. Mr. Owen Griffith, Llanfairfechan, is the masonry contractor.

On Sunday the R.C. Bishop of Amycla opened a new monastery and retreat of St. Joseph, erected by the brothers of the Passionist Order, Highgate-hill. The house is intended as a seminary for novices of the order, and also as a home for the laity who may wish to make retreat. The first stone of the new building was laid some three years ago, but the date of the establishment of the mission is very much further back. The plans were furnished by Mr. F. W. Tasker, of John-street, Bedford-row, the style of architecture being a massive type of early Italian, and were illustrated in this journal on January 1st, 1875.

MUNICIPAL BUILDINGS
Gt YARMOUTH

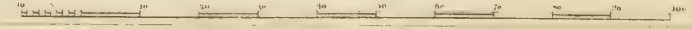


North or Entrance Elevation



West Elevation

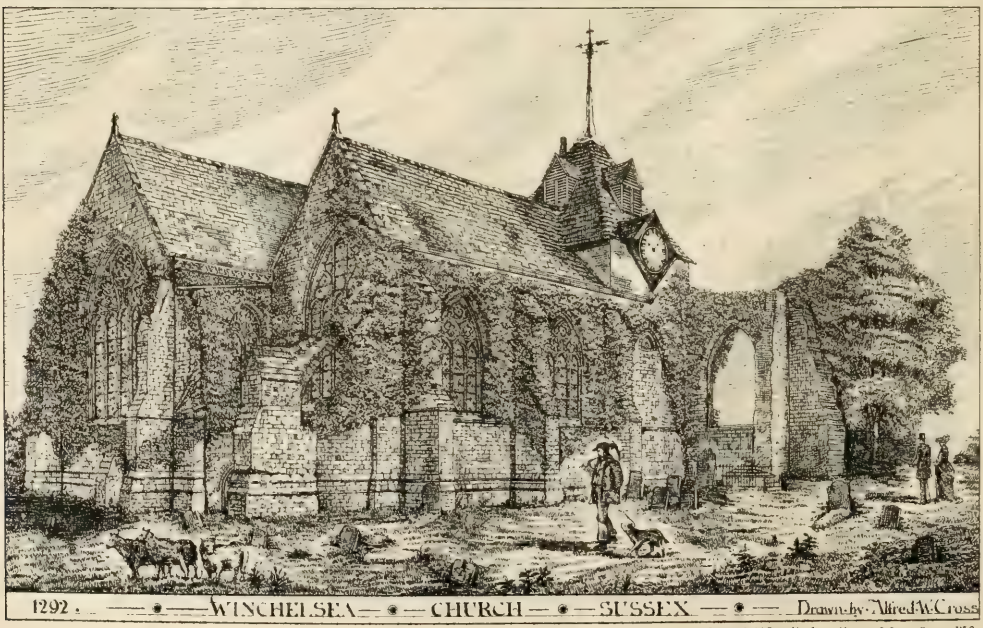
Scale of Feet



Mott & F. Adams, lith.

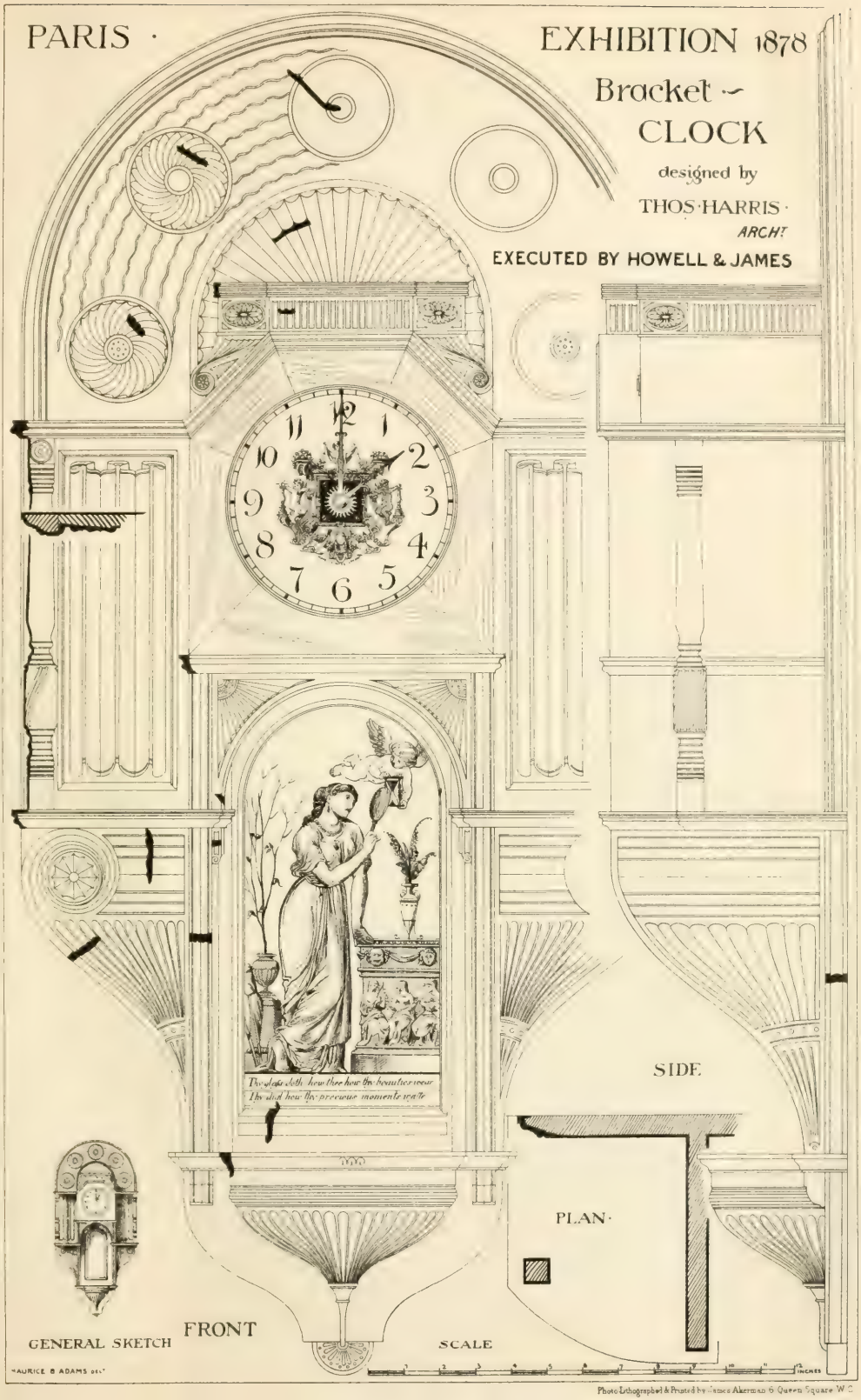
L. Bonney Architect

Photo-Lithographed by Hodgson & Son, Aldersgate St. & Queen Square, W.C.



1292. WINCHELSEA CHURCH SUSSEX Drawn by Alfred W. Cross

Photo Lithographed & Printed by James Akerman, 6 Queen Square W.C.



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NEW BANK
FOR
MESSRS PINCKNEY BROS
SALISBURY

OUR COMMONPLACE COLUMN.

CHIMNEY.

THE height of a chimney shaft depends chiefly on the volume of air required for combustion, and a variety of other circumstances. Hurst gives the following table, based upon the weight of coal consumed per hour:—

	Height of shaft.
100lb. and under	60ft.
500lb. ,, ...	100ft.
1,000lb. ,, ...	120ft.
2,000lb. ,, ...	140ft.
3,000lb. ,, ...	160ft.
4,000lb. ,, ...	180ft.
5,000lb. ,, ...	200ft.

Proportions: External diameter at base may be equal to one-twelfth the height, though in lofty shafts this proportion is exceeded. *Stability:* The points to be observed are a sufficient substance of material at the foundations to prevent overturning or crushing, particularly from the force of wind which is likely to produce a varying intensity of pressure at the base. Mortar is preferred to Portland cement, as it stands heat better. (See Rankine's "Civil Engineering.") *House Chimneys:* Outside chimneys, or those built in an outer wall, should be at least 14in. thick in the back of flue. Short chimneys should be smaller than those of greater height. To prevent smoke the fireplace should be reduced in height, or the flue should be contracted at the throat; the latter plan is found a cure in most instances, as it quickens the draught. A small grate, a lengthening of the flue, or its reduction at top or bottom, produces the same effect. Chimney tops should be carried above a roof, and be free from obstruction. The reader is referred to various replies in the BUILDING NEWS and to Mr. Edwards's "Treatise on Chimneys."

CHOIR SCREEN.

Choir screens originated from the stone balustrade or railings which separated the presbyterium from the other parts of the ancient basilica. These screens were afterwards retained to separate the space devoted to the clergy from that portion allotted to the congregation. Choir screens were frequently of the most elaborate design, and were adorned with statues and traceried openings or panels. On the Continent many magnificent examples are to be found. The screen of the minster at Basle, that at Havelberg Cathedral, Münster, Germany, and the Magdalene Church, Troyes, France, are splendid instances of choir screens. In England we may name Long Sutton, Kingsbury, Barnwell, Newark, Stanton Harcourt, and Chester Cathedral, in which churches the screen or rood-loft appear to have been used. The parclose screens at Fyfield (Berks), Ingham (Norfolk), Lavenham, Long Melford, Southwold, and Spalding are good examples of wooden screens of the Perpendicular period.

CHURCH ACCOMMODATION.

Areas: The usual allowance for each person is from 5 to 7 superficial feet; of course this includes passages, &c. In estimating the width of pews 32in. to 36in. may be taken from centre to centre, the latter being the preferable space; and for the length of seats 18in. to 20in. may be calculated for each person. The church-building societies usually allow 20in. × 34in. for each adult sitting; for children, 14in. × 27in.; and for free seats 20in. × 27in. *Height of Seats, &c.:* Eighteen inches is an ordinary height from floor, and the seat should slope downwards at the back about an inch; bookboards should be about 32in. from floor. *Backs* should slope; 2in. to 3in. is usually allowed. The Incorporated Society provide not less than 2ft. 9in. from centre to centre of backs when they are perpendicular, and not less than 2ft. 10in. when they are sloping; 3ft. is the recommended distance from centre to centre. *Thickness of Walls:* The Incorporated Society require walls, if less than 20ft. high and carrying a roof not exceeding 20ft. span, to be 1ft. 10½in. thick if of dressed stone or brick, and 2ft. 3in. if of brick, faced with flint or stone, or inferior stone or rubble; if 20ft. high and under 30ft., or with a roof exceeding 20ft. span, the thickness to be from 2ft. 3in. to 2ft. 6in. (See rules of the Incorporated Society for Building Churches.)

CIBORIUM.

Originally this name was applied to the baldachin or canopy over the altar, but now generally designates the vessel on the altar for holding the consecrated host. The ciborium is made of brass or of precious metals, and in the Romanesque period was formed like a round cup covered with sculpture. In later Gothic the ciborium assumed a more slender form, and was surmounted with a conical or spire-like covering. Examples may be found in Pugin's works.

CISTERN.

Cisterns are made of various materials—wood, lined with lead and zinc, galvanised iron, and enamelled slate. Slate cisterns are recommended for house purposes. Lead should be avoided, as soft water acts upon it. The overflows of all cisterns should be brought down external wall, and made to discharge on an open gully. It may be trapped at the top by an ordinary siphon. Another and less costly plan is to carry the overflow pipe through the wall, simply allowing it to terminate as a visible outlet, the only objection to the plan being that a leaking ball-cock will cause the wall to become damp. There should be no connection with the drain. *Size:* Six gallons per cubic foot is the approximate capacity for cisterns, and a cistern 4ft. × 3ft. × 2ft. 6in. would suffice. There should be two cisterns, one for drinking water and the other for flushing purposes. Cistern filters, such as Lipscombe's, are necessary. Cisterns should be covered to prevent contamination by vegetable and animal matter, and a good suggestion has been made by Mr. Morris, in his "Hydrosthetics of the Cistern." that the lid should be dust-proof, and that a small trap should be provided in it for cleaning. (See article in BUILDING NEWS, page 102, *ante*.)

CLOISTER.

From the French, *cloître, claustrum*, an enclosure. The cloister usually ran along three sides of the area, called the cloister-garth. The roof was lean-to, supported by an arcade, richly traceried or trefoiled. The cloisters of Gloucester furnish a good example of the arcade of the 14th century. Monasteries usually had cloisters, some of great width and beauty, and vaulted above. The cloisters formed a communication between the church, chapter-house, refectory, and other apartments, and were used for exercise. Lavatories and benches, formed as arcades, are frequently found against the outer wall. In the remains of old monasteries the corbels of the vaulted ceiling or for the roof timbers, are to be met with, often richly carved, but few remains of cloisters are to be seen. At Gloucester and Durham cells or stalls are found. "J. A." sends the following notes on a few cloisters:—"The term is more particularly applied to the covered walk which was usually appended to our ancient monasteries, but a great number of cathedrals in England and Wales possess what are termed cloisters or passages that usually take a quadrangular form. The following are a few particulars of some of them:—In Gloucester Cathedral, Abbot Horton began the cloisters about the year 1375; they were finished by Frowcester between 1381 and 1412. They are rich and elegant to an unparalleled degree; they are of more than ordinary extent, breadth, and height. The fan tracery of the vaulting, and the feathered panelling of the walls produce together a superb effect. Only two sides of the bishop's cloisters remain at Hereford Cathedral (they are called the bishop's to distinguish them from the others, which belong to the vicar's college.) They are of Perpendicular character, and good design. The cloister at Worcester Cathedral is a fine and interesting example of the Decorated period of the pointed style. At the intersection of the ribs of the vaulting are numerous bosses of varied and curious designs. The different walks of the cloister may vary in length. That on the east is 125ft., the other three 120ft. long; breadth of all four, 16ft.; the height, 17ft. At Chester the cloisters are on the north side, which is not usual in countries so far north as England, and form a quadrangle of about 110ft. square. There were four walks, but the south is destroyed. The general style is that of the 15th century. At Chichester the cloisters are on the south side. They are built only on three sides, all of unequal lengths—not at right angles to each other, nor to the walls of the cathedral, which occupy the fourth side; the space enclosed is, of course, irregular. The windows are of Early Perpendicular character; the roof is flat, and of wood. At Norwich Cathedral the cloisters (which are surpassed by none in beauty of architecture and solemnity of effect) are on the south side. They form a square of about 150ft. The style of architecture, Decorated Gothic, though not altogether unmixed with details belonging to a succeeding style. The windows all round are of three lights each, with tracery of good design in the heads of them."

CLOSETS.

In the planning of water-closets the windows should be placed high, close to the ceiling. It is best to isolate water-closets—*i.e.*, place them in towers or projecting buildings, with a lobby between them and the house, so that a current of air may cross. In every case there should be two doors—one at the closet, and the other on the house side of lobby. The cistern for flushing should be placed at the summit of the tower. *Kinds of apparatus:* These are various. 1. There is the round hopper-pan, with siphon, of the common kind used for offices. It is generally, however, the cleanest and the least troublesome when a good pressure of water is secured. The "Paragon" pan is not so clean in operation. These are are made in glazed earthenware and enamelled iron. 2. Pan closets. Bramah's is the earliest of these, and has been much used; but the container below the pan has been found objectionable and holds gas. 3. Valve closets. These are now most in use in good houses, and there are several varieties. Underhay's regulator valve is one of the best, being free from service hose, cranks, and wires. Some of the best forms of valve closets are manufactured by Mr. Jennings and Messrs. Doulton, of Lambeth. In all these the container is omitted; the action is by a simple valve with ground fillings, and sometimes noiseless in action. Those made wholly of white earthenware, pan and siphon combined, are the most cleanly. We may mention also the closets of Messrs. Tylor and Sons. The prices of these various sorts of closets range from 7s. for common "hoppers" to £5 and £6 for the best valves. *Earth closets:* Of these we may mention Moule's as the best.

COACH-HOUSE.

Dimensions: For a coach-house 18 to 20ft. is a good depth. The height should be 10 to 12ft., and the width of doors not less than 8ft. (See *post*, Stable.)

COFFERDAM.

Cofferdams are used for building the piers of bridges, quay walls, &c., and are generally constructed of rows of timber piles driven close together, called sheeting. Sometimes the piles are notched or dovetailed into one another. The space between the rows of piles is then pumped out to the solid bottom, and filled with clay puddle. High-water cofferdams must be provided with sluices to allow the water to get out during the ebb, and to shut against it during the flood tide; the remaining water is got rid of by pumps. For shallow foundations, where the tide has a great range of fall, tidal dams are required. These are formed of sheet piles, or are boxes of iron or planking weighted and sunk into the ground, and called "caisson dams." They enclose the space to be guarded by the dam. When sunk, two rows of piles along the outer and inner face of the enclosure are lowered vertically side by side until their ends rest firmly on the bottom, and bolted in position to sides of the caissons. The latter are then weighted till they rest on the piles. A third row of piles framed to the inner row of main piles is now set up within them, and between these the dam is formed, with two linings of plank and a puddle wall. The common rule for the thickness of a cofferdam is to make it equal to the height above ground if the height does not exceed 10ft., and for greater heights to add to 10ft. one third of the excess of height above 10ft. From 2ft. to 5ft. of puddle clay is sufficient to make watertight. The piles should be well braced and strutted. The total pressure against one side may be

found by formula—$P = w\,b\,x^2 \div 2$, where w = weight of cubic foot of water, b = breadth in feet of division of dam, and x depth of water.

COLUMN.

Stability: The stability of a column depends mainly on their diameter and the coefficient of elasticity. A long column varies in strength as the fourth power of the diameter directly, and as the square of the length inversely. It is evident that in a long pillar the resistance to compression does not depend on the direct strength of the material, as in a short one, but on the resistance to flexure or bending, and the rules that have been employed have been based on this consideration. We refer the reader to numerous articles in the BUILDING NEWS upon the strength of pillars of wood and iron, to Mr. Hodgkinson's investigations, explained in all textbooks of construction, and to those of Mr. Stoney, in all which rules or formulæ will be found. In ordinary pillars under 30 diameters long, as used in general construction, the resistance is partly compressive and partly transverse. We may also remark that the strength of a solid square cast-iron pillar is 50 per cent. more than that of a round one of the same diameter. Columns should be truly vertical under the load, be squarely fixed, and have discs top and bottom. Tables of the strength of cast-iron columns are to be found in "Hurst's Handbook." *Proportions of columns:* The general proportions of the five orders of columns are as follows:—

Tuscan column	7 diameters
Doric (Roman)	8 diameters
Ionic "	9 diameters
Corinthian and Composite	10 diameters

These include the capital and base. The entablature is commonly taken as ⅓th the height of column. The relative strength of columns having the same sectional area, but with different forms of section, are, for a circular column, 100; square, 93; triangular, 110.

COMMISSION.

We shall here give the established style of charges recognised by architects and surveyors, and sanctioned by the Royal Institute of British Architects:—

1. Preliminary designs, survey of site	1¼ per cent.
2. General drawings, such as plans, elevation, sections, specification, and approximate estimate	1¼ per cent.
3. Working and detail drawings	1¼ per cent.
4. Superintendence, exclusive of clerk of works	1¼ per cent.

The above charge of 5 per cent. is to be estimated on the total value of all materials and labour supplied. If the architect only supplies design he can charge 1¼ per cent.; if all plans necessary for contract, he can charge 2½, and so on according to the stage of work performed. It will be thus seen that the 5 per cent. is divided into four equal parts, representing the different stages of an architect's labour. But beyond these general charges the architect is entitled to travelling and incidental expenses. For works in which the expenditure is mainly for skilled labour—*e.g.*, in designs for alterations, fittings, furniture, and decoration—the architect's charge should be regulated by special circumstances. In works of small value—say, £500 in amount—the charge should be by time or an ascending scale, reaching 10 per cent. for works under £100. When several similar buildings are erected from a single set of drawings, and under one contract, a commission of 5 per cent. may be charged on the cost of one building, and a modified arrangement made in respect of the others. 2½ per cent. is charged upon works originally included in contract, but afterwards omitted. For procuring and examining tenders ½ per cent., in addition to the usual percentage, can be charged. Alterations of the design, attending committee meetings, and arranging disputes, can be charged by the day. *Surveyors' rates* are:—For measuring works in small new buildings and in repairs, including bill, 2½ per cent.; ditto for new works of plain character, 1½ per cent. For elaborate works the charge is 1¼ per cent. and upwards; for small works the charge is by day. For preparing quantities for small or elaborate works, 2½ per cent.; ditto for ordinary works of £10,000 or under, 1½ per cent.; ditto above £1,000, by a diminishing scale. For valuations the Institute scale is:—On the first £1,000 1 per cent.; on remainder up to £10,000, ½ per cent.; travelling expenses, &c., extra; for dilapidations on estimate, 5 per cent. *Estates:* For laying out a building estate the charge should be regulated by time and trouble; for letting the plots the charge may be a sum not exceeding a year's ground rent. (See the "Institute Schedule of Rules" for details.)

Notes and contributions on subjects in the letter D will be received on or before Tuesday, the 17th of September. We solicit facts or apt quotations on Dado, Dairy, Damp-course, Deafening, Design, Dining-room, Disinfection, Distemper, Dolmen, Dome, Drawing-room, Dry Rot, &c.

OUTLINES OF ORNAMENT.*

A NOTICE of this work has already appeared in our pages. Parts II. and III. are before us, and appear to sustain the opinion we have given of Messrs. Audsley's work as a step towards the education of the young artist in ornament. The authors, as we have said, deal rather with the principles or grammar of ornament, by combining the characteristic elements of form in its various aspects, and showing how these elements can be grouped without destroying the pervading character or style. Thus the examples of the fret ornament in Part II. exhibit the natural development of that ornament from the probable grouping of bricks or pieces of wood to that used by the Byzantine and Eastern artist. It is interesting and instructive to trace the combination of different elements producing varieties of fret such as the Romanesque, Middle Age, and Oriental types afford. In one plate given we have a painted ceiling of a tomb at Siout, from a drawing by Mr. R. Phené Spiers, showing a zig-zag arrangement of frets. In the Greek patterns, or rather Etruscan, we get the purest and most developed form of the rectangular elements, where the meander is continuous and equal in width to the spaces left. The examples given comprise some of the most beautiful modifications of fret borders and surfaces, some in which the types intersect, and others in which the meander is raised instead of flat, or shaded to give a solid effect. The entwined combinations produce a very effective kind of decoration, either for borders or surfaces. The fret is traced through the Roman, Romanesque, and Middle Age epochs, in all of which it appears. The Greek form of fret is, as the authors say, best drawn on a reticulated surface—that is, by the use of paper marked with a series of equal spaced lines crossing at right angles, and to fill up certain contiguous squares so formed. In other cases the lines cross at a certain angle, as in many of those of Middle Age design. The Celtic frets, dating from the seventh to the ninth centuries, are interesting and quaint modifications. The parts before us exemplify some beautiful varieties of Classic, Oriental, and Japanese frets, that will be found very suggestive to the decorative artist. We note especially the Japanese fret diapers (Figs. 1, 2, 3), and we agree with the authors in the remark that "probably no artists have displayed more appreciation for fret decoration than the Japanese," though they are supposed to have been later than the Chinese in its adoption. One point of difference is remarked between the Classic and Oriental frets—namely, that the former are generally continuous and regular, while the latter are disconnected and irregular in repetitions. Besides the fret there are given some exceedingly pleasing diapers of another type, and we particularly mention the Japanese powdered ornament, the modern French diapers upon gold ground, with blue and red foliage outlined with black. The Dutch Middle Age examples of diapers are interesting just now. The letterpress adds much to the value of the work as an educational guide, and we commend the "Outlines of Ornament" as certainly the most systematic exposition of the subject at a moderate price.

* Outlines of Ornament in all Styles, &c. By W. and G. AUDSLEY, F.R.I.B.A. Parts II. and III.

SANITARY ENGINEERING.*

ONE of the most comprehensive handbooks to sanitary engineering is that of Mr. Baldwin Latham, published about five years ago, and we are glad to see a second edition has been called for, in which important additional information, the result of a few years of unparalleled activity in sanitary science, has been incorporated. There cannot be a doubt but that the interest awakened in sanitary matters promises to glut the market with publications, many of them excellent, and others of a speculative and advertising character. Sanitation is one of those branches of practical science that has become a hobby with many of an ingenious turn of mind, and patents without number have been taken out upon identical principles till the public are perplexed, and the profession have need of some guidance. Mr. Latham's new edition is well adapted to give the professional architect or engineer all the information he requires; it enters into the theory of sewerage and house-drainage, and though we cannot always agree with the author in the means he advocates, the work has the advantage of describing and illustrating the leading theories, appliances, and patents. The typography, illustrations, and wood engravings are excellent, and the rules for ascertaining rainfall, the discharge of sewers, and the tables of velocities, will be found full and reliable. Looking over the pages of the new edition we find much valuable information in results of sanitary measures and the author's experience at Croydon; the dry and water carriage systems are discussed, the preference of the author being given to the latter; the operations required in laying out plans for sewerage are explained, and will be of great service to the younger members of the profession; the construction and forms of sewers are fully considered and amply illustrated; while the important questions of the ventilation of sewers and drains, and house-drainage, and the many mechanical appliances of gullies and traps and closet apparatus in use are impartially dealt with. Regarding the great question of sewage disposal, we may at once say that Mr. Latham is a firm believer in sewage irrigation where it can be carried out, though he speaks with moderation of other systems. It is a prevalent idea with some people that the water-carried system entails greater expense in carrying away the sewage than the ash-pit and earth-closet mode of collection, but the author says that with perfect water-waste preventing fittings, the volume of sewage is not materially increased, and, therefore, in districts where the dry system is used, the same size of sewer is desirable. This is shown by a table of the volume of sewage in various towns, and the result is of some moment. The chapter on self-cleansing sewers contains little that is new, though reperusal will well repay the reader. In order to prevent deposit in small drains of 6in. or 9in. in diameter, the author says a velocity of not less than 3ft. per second should be produced; while sewers from 12in. to 24in. in diameter should have a velocity of not less than 2½ft. per second; and in no case should the velocity be less than 2ft. per second. It must be remembered that the velocity is proportioned to the square root of the section divided by the wet perimeter. Thus a small sewer requires a greater fall than a larger one, and the engineer often neglects to adjust the sizes of his sewers to the volume to be discharged and the fall. The tables of velocities for various heads and forms of sewers by which the inclination may be determined will be found of great value and completeness to the practical man; they have been worked out from Weisbach's formulæ. Tables of discharge follow for sewers of different forms, inverts, and dimensions. The author shows the great saving in adopting intercepting sewers, especially in large towns, by dividing the district into smaller and more manageable areas. This saving is shown clearly by comparing a sewer to a cone, with its base resting on the lowest portion of the district, and the apex terminating in the highest. The intercepting sewer cuts this cone, and the difference in cost of

* Sanitary Engineering: A Guide to the Construction of Works of Sewerage and House Drainage, &c. By BALDWIN LATHAM, C.E., M.I.C.E., F.G.S., &c. Second edition. London: E. and F. N. SPON, Charing-cross.

construction is represented as equal to the difference between the lower portion of cone cut off, and another complete but smaller cone, the apex of which would commence at the intercepting sewer, and the base extend to the lowest level of district. Would it not have been more apposite to have called the cone a triangle? The chapters on the sectional forms and construction of sewers, brick, and cast-iron sewers, are full of useful facts and rules. We note, for instance, the bursting of cast-iron water pipes, under certain conditions of manufacture which render them "cold short," due to change of temperature after laying, some valuable descriptions of flushing arrangements, &c.; but we pass on to the chapter on ventilation, in which we find several references to recent notions and proposals. The author adduces much evidence to prove the inefficiency of shafts to extract foul gases, even when aided by artificial heat, as in factory chimney shafts, and that the currents do not extend far enough to be of value; the use of charcoal is still recommended, and here we are bound to differ from Mr. Latham, though he is the inventor of a very ingenious spiral ventilator. We need not here repeat the reasons we have adduced against the employment of any form of disinfectant in place of free ventilation, but the experience of the last few years has been convincing, to say nothing of the short duration of the use of charcoal as a deodorising agent. In the ventilation of house drains we notice various proposals which have been recorded in the Building News. Mr. Latham lays stress upon the importance of distinct ventilation for both sewers and house drains; he recommends the ventilating pipe carried up at the head of every drain and its branches, and he thinks charcoal trays at the outlets are advantageous. Mr. Buchan's system of house-drainage is mentioned as being correct in its principle; allusion is also made to the plan lately recommended in our pages by Mr. Norman Shaw, which gave rise to much discussion, but which is identical with previous contrivances we have mentioned. Mr. Latham says Mr. Shaw's plan is not applicable to basements, and is open to the objection already broached in connection with the effect of frost choking the heads of spouts, and he instances his own house waste-pipes as having become choked with ice. Mr. Latham does not allude to a proposition put forward in our own pages, showing how this very trifling defect might be obviated, and we must say all the objections against the use of open soil pipes we have heard are of little moment when the overwhelming facts in their favour are considered—nameiy, their non-retention of gas, the constant escape of every particle of gas that can be generated, their disconnection with the drains, to say nothing of simplicity. The numerous forms of traps and sanitary fittings given in this edition will make it a valuable *aide-memoire* on sanitary matters, and we again recommend it as a useful guide to all connected with the drainage of towns and houses.

A cottage hospital, which has been built at Purton at the sole cost of Captain Wykeham-Martin, was opened last week. It is built of red brick, with bands of black brick and stone facings. Mr. J. R. Shopland, of Swindon, was the architect, and Mr. Tidmarsh, of Purton, the contractor.

A new Baptist chapel was opened at Oswaldtwistle, near Accrington, on Thursday week. The chapel, a stone one, is 71ft. long by 42ft. wide internally, and will accommodate about 750 persons. It is estimated to cost £3,350, including purchase of land. Mr. Baines, of Accrington, is the architect.

The memorial stone of a new Wesleyan chapel was laid at East Vale, Longton, Staff., on Saturday. The chapel will accommodate 200 persons, and is being erected by Messrs. Wetton and Meakin, of Fenton, from designs by Mr. T. P. Hulse, architect, Longton.

Mr. E. B. Stephens, A.R.A., the sculptor, had the honour paid him on Friday of having his chief work, "The Deerstalker," erected by public subscription in his native city, Exeter. It is a bronze group, valued at £1,000. Devonshire men in London started the idea of securing and erecting it in Exeter, as a tribute to the genius of the artist. The Corporation of the city provided a Carleon granite pedestal for the group, and it was on Friday unveiled in the Bedford-circus. Mr. Stephens was subsequently entertained at a banquet.

COMPETITIONS.

Aston Public Buildings.—The local board of Aston, near Birmingham, received in June last nineteen competitive designs for the proposed public buildings, in response to offers of premiums of £150, £100, and £50 for 1st, and, and 3rd best, and have since submitted these plans and designs to Mr. Alfred Waterhouse, A.R.A. On Tuesday last a report was received by the local board from their highway committee, stating that the committee agreed with Mr. Waterhouse's selection of those of "Model Plan," "Dignitas," and "T.," and recommending the board to ascertain the names of the successful competitors, and to arrange for a public exhibition of the designs. This report was adopted, and on opening the envelopes the names of the successful competitors were found to be—"Model Plan," Messrs. Alexander and Henman, Stockton-on-Tees and Middlesbrough; "Dignitas," Mr. J. G. Dunn, Waterloo-street, Birmingham; "T.," Mr. T. F. Proud, 26, Exchange-buildings, Birmingham. We understand that Messrs. Alexander and Henman's design is Classical in style. We have already arranged to illustrate some of the premiated designs.

Patent Office, Washington, U.S.A.—The expert committee of architects, chosen by the United States Government Secretary of the Interior to examine the competitive plans submitted for the restoration and reconstruction of the Patent Office Building at Washington, recently destroyed by fire, have made their report. Thirteen competitors have submitted 110 sheets, containing more than 254 drawings. The committee have decided that the contribution submitted, as afterwards discovered, by Mr. J. A. Frydagh, of Terre Haute, Indiana, contained "the most intelligent embodiment of the requirements and suggestions" of the programme. This design proposes the erection of an additional attic upon the walls of the present building, so as to form an essential part of the architectural composition of the exterior, giving a new story of offices, seventy-two in number. All attempts made by the competitors to contrive, as suggested by the circulars of the Department, a new story which should be practically invisible from the streets, were found to result in such obvious imperfections of distribution in the plan, and to involve such serious inconveniences in respect to light, air, space, and circulation, that the alternative of a new story was considered the only practicable scheme.

The death occurred a fortnight since of Mr Richard Upjohn, of New York, one of the oldest and most prominent church architects in the United States. Born in England in 1802, he emigrated at the age of 27 to Massachusetts, and in 1835 removed to New York. Among his best known works are Trinity Church, the Trinity Building, at No. 111, Broadway, and St. Thomas Church, N.Y., Grace Church, Christ Church, and the Church of the Pilgrims, in Brooklyn, and a church at Bangor, Me. The last named edifice was his first public work of importance.

The Duchess de Galliera has approved of the plans prepared by M. Ginin, architect to the city of Paris, for the construction of a museum intended to receive the collection of pictures and objects of art formed by the late duke, her husband.

New board schools were opened by the School Board for King's Norton, near Birmingham, on Saturday. They accommodate 321 scholars, at a cost of £3,640. Mr. W. Hale was the architect, and Mr. J. Cresswell, of Five Ways, the contractor.

Cardinal Manning opened, on Sunday, a new church, dedicated to St. Joseph, at Peasley-cross, St. Helens.

At the West Riding Court House, Pontefract, on Saturday, William Lee, of Wragby, was summoned for having worked at his ordinary calling as a brickmaker, on Sunday, the 18th August, and was fined 2s. 6d., and costs 11s. 6d. Defendant had been engaged scraping bricks.

The Government authorities have granted permission for the erection of a second pier on the long stretch of esplanade at Southsea. The directors have accepted the tender of Messrs. Head, Wrightson, and Co., of Stockton-on-Tees, who have engaged to complete it within 9 months. Its entire length will be 580ft., including a large pier head of octagon shape 145ft. in diameter. Mr. George Rake, of Southsea and Portsea, is the engineer.

A fresco of "Christ Blessing Little Children," by Messrs. Campbell and Smith, of Southampton-row has been presented to the church of The Saviour, Bier-lane, Windsor, by the 1st Life Guards.

ARCHÆOLOGICAL.

Exhumation of a Buried Italian Basilica.—An interesting work has been in progress for some years past in the Via Ardeatina, having for its aim the excavation of the site of a large and important Christian basilica, dedicated to St. Petronilla. The work was commenced five years since by the late Mgr. Saverio de Merode, who, under the advice of the well-known Roman archæologist, the Commendatore G. B. De Rossi, purchased the farm of Tor Marancia, in the Via Ardeatina, in order to search for this buried basilica and the tombs of the martyrs Nereus and Achilleus, of which not a trace existed on the surface of the ground. The works of excavation were carried on under the direction of the Committee of Sacred Archæology. The basilica, which was erected at the level of the second story of the cemetery of Domitilla, was brought to light by removing the heaps of rubbish which covered it. It consisted of three naves supported on columns, which were found lying prostrate near their respective bases. In the apse were found fragments of a marble inscription placed by Pope S. Damasus on the tomb of Nereus and Achilleus. One of the pillars of the tabernacle of the altar erected on the same tomb was also discovered, as well as a *basso relievo* representing the martyrdom of Achilleus, with his name inscribed on the marble. Behind the apse was discovered a singular painting of St. Petronilla, and in and near the apse were numerous fragments of epitaphs and monuments of early Christians. It was decided to preserve these important remains of early Christianity by restoring and covering with a suitable roof the basilica. The columns were raised and fixed in their places, and the foundations were strengthened and the walls restored. Plans for a new roof have since been made by Commendatore Fontana, the architect to the Committee of Sacred Archæology, and will be carried out.

Midland Institute.—The last excursion of the season took place on Saturday last. The members walked from Hagley to St. Kenelm's Chapel, a small Norman shrine with fourteenth century additions and modern woodwork and fittings. Here the rude figure of the boy king and saint upon the south wall was pointed to by Dr. Langford, who repeated the legend relating thereto. The scanty remains of Hales Owen Abbey were next examined, and on the site Mr. Cossens described the plans, character, and history of this Prænonstratensian monastery.

At a meeting of parishioners of Caversham, near Reading, last week, the committee were authorised to expend not more than £2,400 in erecting a tower and south aisle containing 120 sittings, in accordance with plans and designs prepared by Messrs. Morris and Stallwood, of Reading, and illustrated in the Building News of March 8 last.

The Altrincham rural sanitary authority, on Wednesday week, instructed Mr. Newton, of the firm of Cawley, Newton, and Smith, engineers, Manchester, to prepare the necessary plans for the drainage of Knutsford, Dunham, and Hale. A letter was read from the Public Works Loan Commissioners granting a loan of £1,750 for the drainage of this township, and the sum of £2,500 for the drainage of the township of Hale.

The managers of the Central London School District, on Friday, adopted plans by Mr. Hudson, for improvements and additions to the school buildings at Hanwell, to be carried out at an estimated cost of £4,500. Six firms of builders have been requested to tender for the work.

Bristol has paid a tribute to the memory of the late Miss Mary Carpenter, by erecting a handsome marble tablet, surmounted by a large-sized medallion profile of the great lady philanthropist, in the cathedral. The memorial has an inscription recording Miss Carpenter's labours in England and India.

The second son of Mr. Millais, R.A., died on Friday, at Bowerswell, Perth, at the age of 20.

The Improvement Commissioners of Milton-next-Sittingbourne have appointed Mr. H. W. Clarke, lately of the Amsterdam Canal Harbour Works, Holland, as surveyor. A report has been received on the sewerage of the town from Mr. Robinson, the engineer, by whom the new scheme for sewerage and waterworks will be prepared.

A new Primitive Methodist chapel is about to be erected at Bridlington Quay, from the designs of Mr. W. Freeman, of Hull. Mr. Gray, of Bridlington Quay, is the contractor. The chapel will seat 800 persons.

Building Intelligence.

BELPER.—Three new buildings—viz., the Pottery School, the Cowhill School, and the High-street School—were opened by the Belper School Board on Monday. The interior of the schools is light and cheerful. Ventilation is provided to each by a lantern light in the centre, as well by other means. The floors consist of blocks of wood, prepared and laid solid. The contract for the Pottery School was £3,156; for the Cowhill School, £2,101; and the High-street, £870. The extras amounted to £1,725, making a total of £7,852. Messrs. Giles and Brookhouse, of Derby, were the architects for the whole of the buildings. The contractor for the Pottery and Cowhill Schools was Mr. William Slater, of Normanton-road, Derby, and for the High-street School, Mr. J. Glossop, of Ambergate.

BRADFORD.—Three large hotels are approaching completion at Bradford. One of these, the Alexandra Hotel, Great Horton-road, is constructed almost entirely of brick, and is finished on the exterior with stucco. Another is the Talbot, in Kirkgate and Bank-street, erected on the site of the old Talbot, a famous hostelry in the coaching and later days. Both the Alexandra and the Talbot have been built from the designs of Messrs. Andrews and Pepper, architects, Bradford. The Talbot Hotel is built of stone. There is a row of shops on the ground floor, and the hotel is over these. The third hotel has been erected near the bottom of Manchester-road, from the designs of Mr. R. Calvert, architect. This building is constructed of stone, five stories in height, with dormers above.

EDINBURGH.—On Monday the head office in Edinburgh of the Union Bank of Scotland was transferred from Parliament-square to the new premises in George-street. These were designed by the late Mr. David Bryce, R.S.A, in a style of elegant simplicity, relying for effect on symmetrical proportion and congruity of parts. The frontage, measuring over 100ft. in length, presents on the ground floor three entrances, each having a portico of Ionic columns. The first-floor windows are flanked with pilasters, and surmounted by triangular pediments; while those of the second-floor have architraves and moulded sills, the wall head being furnished with a rich cornice and stone balustrade. Of the internal arrangements, the leading feature is the telling-room, which is reached by a door on the left of the central entrance hall. This is a spacious apartment, formed partly in the main building, but chiefly in an annexe of one story, occupying a portion of the ground to the rear. It has a coved ceiling, richly panelled in stucco work, and pierced with lights, and is fitted up with the usual desks and counters in tastefully-wrought mahogany. In convenient proximity to the telling-room are the manager's room, accountant's room, and necessary waiting rooms, a board-room for the directors being also provided on the George-street front. In the sunk basement are a library, with due provision of safes for various bank purposes; while the two upper flats of the building are appropriated as dwellings. The plans have been carried out under the supervision of Mr. John Bryce, nephew of the architect by whom they were prepared; the building work having been executed by Messrs. Beattie and Sons, and the fitting up of the telling-room and other cabinet furnishings by Messrs. John Taylor and Son.

KILBURN.—The memorial stones of a new Bible Christian chapel, at Kilburn, were laid on Monday week. The architect is Mr. W. Ranger, of 3, Finsbury-place, South; and the builder is Mr. John Allen, of Kilburn-park-road. The chapel will be a plain, substantial building, in the Italian style, 50ft. in length, and 42ft. in width, and will have galleries all round. Nearly 500 sittings will be provided. The building will be of brick; yellow malms being used for facing, and the piers, bands, arches, &c., will be in red brick and tuck pointed. The front of the chapel will be divided into three bays by intended projecting piers, surmounted with moulded caps, entablature, and coping. All the windows in front will be with semi-circular heads.

LEOMINSTER.—Among the many restorations of old churches and abbeys now going on throughout England, that of the venerable Priory Church of Leominster, St. Peter and St. Paul, seems to have almost escaped notice, though containing within itself some of the finest specimens of early Norman architecture, as also of the purest and noblest examples of Gothic in the kingdom. In the year 1863 it was proposed to effect a thorough restoration of the whole edifice, and for this purpose a committee was formed to consult the late Sir Gilbert Scott, R.A., upon the subject. After a thorough survey he estimated the cost at upwards of £15,000, and in May, 1864, the work was commenced with the Norman nave and aisle, and north end of the church. A second committee has recently been formed with a view to the restoration of the south side of this fine old pile, and also to fill with stained glass the noble central window of the west side, the latter being a memorial to a member of the Arkwright family. Last year Messrs. Mayer and Co., of Munich and London, were selected to prepare a design, representing in the centre compartments scenes from the life of St. Peter and St. Paul—the patrons of the church—and in the outer divisions the twelve apostles. The centre portion only has been so far executed, and was lately erected, the stonework having been completely restored by Mr. Edwards, of Leominster.

LITTLE HORKESLEY.—The parish church of SS. Peter and Paul, Little Horkesley, Essex, has been re-opened, after entire new roofing, &c. The roof to the chancel is of English oak, with moulded timbers; the roofs to nave and aisle being of pitch pine, wrought and chamfered, the whole being covered with boarding, felt, and lead. The old south wall of aisle being 9in. out of the perpendicular has been straightened. A new vestry and organ-chamber have been added, and the windows repaired and re-glazed. The whole of interior is re-stuccoed and exterior replastered, in accordance with the original work. New open benches in pitch pine take the place of old dilapidated "calves'-pen pews" in nave and aisle, the chancel being fitted up with carved stalls in English oak. The floors of passages throughout have been paved with Minton tiles, and oak paving blocks on concrete have been laid under all the seats. A new organ, by Godball, of Ipswich, has been placed in the organ-chamber. The cost of the restoration is about £3,000. The architect is Mr. Arthur Blomfield, of Montagu-square; and the builder, Mr. Joseph Grimes, of Northgate Works, Colchester.

MAESBROOK.—The consecration of the new Church of St. John the Evangelist, at Maesbrook, took place on Tuesday week, by the Bishop of St. Asaph. The church consists of a nave (the internal dimensions of which are 56ft. by 24ft. 6in.), a north porch, a western bell turret, and vestry on the south side, and affords accommodation for about 150 persons. The chancel is laid with Maw's tiles. Llanymynech stone has been used for the walling, which is pointed internally, and Shelvoke for dressing. The open timbered pitch-pine roof is covered with tiles. Messrs. Jones and Willis, of Birmingham, provided the standards and brackets for lighting. The work has been satisfactorily carried out by Mr. Yates, of Shifnal, from designs and under the superintendence of Mr. Haycock, architect, Shrewsbury, at a total cost, including the boundary wall and gates, of a little over £1,900. Mr. J. Morris acted as foreman for the contractor.

MANNINGHAM.—The Bradford Tradesmen's Home, at Lilycroft, Manningham, erected several years ago, at a cost of some £16,000, has been enlarged by the addition of thirteen more houses. The first block of homes comprised thirty houses, with a handsome assembly-room in the centre of the block, and formed three sides of a square, with a garden in front. The original building was erected from the designs of Messrs. Milnes and France, and the roofs were covered with red tiles, but these being found defective, have been replaced with blue slates at a cost of £850, and the ridge of the houses and apex of the dormers have been finished with red tiles. The thirteen new houses have been built from the designs of Messrs. Andrews and Pepper, in the same style and elevation as the older building, which they face, and stand at the opposite side of the lawn and gardens.

PENMAENMAWR.—The foundation stone of a new English Congregational chapel to be erected at Penmaenmawr, was laid on Monday. The style will be Gothic, the building, in a parallelogram form with an apsidal end, having internal dimensions 76ft. by 37ft., and affording accommodation for 350 worshippers. The materials to be used will be Penmaenmawr stone with limestone dressings, white brick and terra cotta, and a roofing of Bangor slates. Ventilation will be provided by a flèche 65ft. long, and the building will be lighted by 16 lancet windows. Mr. Richard Davies, architect, Bangor, has supplied the designs. The contract has not yet been let, but the cost is estimated at about £2,000.

RIPON.—The rebuilding of Jepson's Hospital, Ripon, is very shortly to be proceeded with. The hospital was founded in the year 1672, and liberally endowed by Zacharias Jepson, of York, a native of Ripon, who left by will £3,000 to feoffees, to purchase lands for the maintenance and education of twenty orphan boys or poor tradesmen's sons in the city of Ripon. The accommodation in the new buildings includes a spacious hall, dining and drawing-rooms, study, kitchen and offices, refectory, schoolroom for 60 pupils, dormitories and 6 bedrooms, bathroom and lavatories, &c. The cost of rebuilding will be defrayed by public subscription, and the building will be in the style in vogue in 1672, from designs by Mr. Joseph W. Bishop, architect, of Ripon, after a public competition.

WARRINGTON.—The foundation stone of an additional infectious diseases hospital was laid on Thursday, the 29th ult. The buildings comprise a twelve-bed ward, a four-bed ward, and an administrative ward. The wards are built of brick, with slated roofs, and have been designed on what is termed the detached block system. Each hospital is complete within itself, having accommodation for male and female patients, the centre being occupied with rooms for the store of linen. At the end of each ward are sculleries with sinks, also water closets and bath-room. The wards are fitted throughout with Messrs. Shillito and Shorland's patent Manchester grates. The hospital was designed by Mr. R. Vawser, C.E., formerly surveyor to the borough, and is being erected by Messrs. J. Gibson and Son, under the direction and superintendence of Mr. Longdin, the present borough surveyor.

Works of drainage are being carried out for the Featherstone Local Board, West Riding, from the designs of Mr. Hodgson, C.E., of Loughborough.

On Monday afternoon new schools erected at Bagillt by the Holywell School Board from the design of Mr. Hill, architect, of London, at a cost of upwards of £6,000, were formally opened.

On Monday Cardinal Manning laid the foundation stone of a new church which is to be erected in Wellington-street, Scholes, for the parish of St. Patrick. The present church seats some 500 people, and is to be used for a school, which, with the present school buildings, will provide accommodation for 1,200 children. The architect of the new church, which will accommodate 1,000 worshippers, is Mr. O'Byrne, of Liverpool, and the builders Messrs. Robinson and Robinson, of the same place, and the probable cost will be about £8,500.

Mr. Henry Green, aged 28 years, late partner in the firm of Messrs. Ashby and Green, architects and surveyors, 45, Cornhill, London, died on the 28th August at Lime Villas, Putney.

Up to the present time 120 English artisans have visited the Paris Exhibition as reporters of various branches of industry. The expense of their visit has been defrayed partly from local funds and partly by the joint committee of the Royal Commissioners and the Society of Arts.

The first stone of the new deep sea-port at Boulogne-sur-Mer will be laid on Monday next. The plans and estimates have been made by M. Stœcklin, chief engineer of the coast of the Pas-de-Calais, who will direct their execution, the estimated cost of which is 17,000,000f. (£680,000), which has been voted. The time required for the execution of the works will be 15 years, but it is hoped that a portion will be sufficiently advanced in five years to insure a steam-packet service at all hours between France and England.

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TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.]

All letters should be addressed to the EDITOR, 31, TAVISTOCK-STREET, COVENT-GARDEN, W.C.

TO OUR READERS.—We shall feel obliged to any of our readers who will favour us with brief notes of works contemplated or in progress in the provinces.

Cheques and Post-office Orders to be made payable to J. PASSMORE EDWARDS.

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Front Page Advertisements and Paragraph Advertisements 1s. per line. No front page or paragraph Advertisement inserted for less than 3s.

Advertisements for the current week must reach the office not later than 5 p.m. on Thursday.

TERMS OF SUBSCRIPTIONS.

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Cases for binding the half-yearly volumes, 2s. each.

RECEIVED.—W. F.—T. E.—B. of H.—H. and G.—W. S.—C. Bros.—J. G. B.—W. B.—E. W.—T. R. R.—J. H. S. and S.—H. T.—J. T. B.

B. H. S. (Your plan is not a new idea, but we shall give it.)

"BUILDING NEWS" DESIGNING CLUB.—T. THURLOW AND OTHERS. (We hope in a few weeks to be able to comply with your request, and recommence the work by publishing a list of subjects.)

Correspondence.

THE BROMPTON ORATORY.

To the Editor of the BUILDING NEWS.

SIR,—As it still continues a matter of doubt, as well as interest, to many of your readers to know which design for the above is chosen for execution, I beg to say it is the one to which the first prize was awarded, and also that the services of its author, Mr. Herbert Gribble, are secured as architect in carrying out the building.—I am, &c., VERITAS.

Bayswater, W.

The arbitrators' awards in the cases of the tolls of Vauxhall-bridge and Charing-cross foot bridge have been given. The price of the former is fixed at £255,000, which sum includes approaches, wharves, and buildings about the bridge, at present the property of the company, while the tolls over the footway by the side of the Charing-cross railway bridge are capitalised at £38,540. The award in the case of Waterloo bridge was £428,000, and that for Lambeth suspension bridge £36,000. The *Echo* asks when the toll bars and turnstiles are to be removed.

The remainder of the new peal of twelve bells for St. Paul's Cathedral have been delivered. It is proposed for the present simply to use them in ringing peals, and not for carillon music.

The synagogue at Singer Hill, Birmingham, has been restored and re-decorated, a work rendered necessary by a fire which took place in the building in January last. The scheme of decoration is, says the *Birmingham Daily Post*, exceedingly rich, and exhibits a more free use of gilding and blue colour, especially in the sanctuary, than previously. The work has been carried out under the direction and supervision of Mr. Yeoville Thomason, the architect of the synagogue when erected in 1856. The decorations have been executed by Mr. Seers, the structural alterations by Messrs. Barnsley and Sons, all of Birmingham.

WATER SUPPLY AND SANITARY MATTERS.

BORINGS FOR WATER AT BOOTLE.—The great bore-hole, 26in. in diameter, which was commenced at Bootle a short time ago under the direction of the Liverpool Water Committee, has now reached a depth of 1,004ft., 4ft. beyond the point stipulated for by the contractors, Messrs. Mather and Platt, of Manchester. Many people hold the theory that the water-bearing strata would be met with beneath Bootle at no very great depth. These strata have not, however, been reached, and the question arises whether or not the boring should be continued in view of the important scientific results that are expected to follow. The new bore-hole is almost wholly in the pebble beds of the Bunter division of the trias rocks. Below the pebble beds the lower mottled sandstone of the Bunter division will probably be met with, and if the permian formation is absent, which many geologists think is likely, the coal measures will be reached immediately below the lower mottled sandstone. The water committee, in a report issued on Saturday, recommend that the boring should be abandoned for the present, but if the town council think otherwise they recommend the acceptance of a tender of the Diamond Boring Company to continue a 6in. bore 500ft. deeper for the sum of £1,750.

WINDSOR.—The new drainage system for the borough of Windsor is now on the point of completion. The Town Council have entered into a contract for the treatment of the sewage by Hillé's system, and in a few days the works will be in operation. A piece of land has been obtained on the river Ham, about two miles from the town, and adjoining the Castle sewage farm, where it is intended to treat the sewage by a combined system of precipitation and filtration. Under the direction of Mr. Hawkesley, C.E., a new outfall sewer, from the point where the existing sewers concentrate to Old Windsor, has been constructed, crossing under the navigation cut to the Ham. This has been a work of great difficulty. A portion of the sewer has been constructed by tunnelling, but at Old Windsor it had to be laid in a cutting in a wet sandy soil, at a depth of over 40ft. The cost of the works, it is estimated, will be about £40,000. Mr. Hillé, who is to be paid a royalty of £50 a year, will manage the works for a short time at his own charge, and he will then hand them over in full operation to the Town Council.

STATUES, MEMORIALS, &c.

WORCESTER CATHEDRAL.—A memorial to the late Lord Lyttelton has just been completed in this cathedral. It consists of an altar-tomb of the fourteenth century Gothic, on which reposes a recumbent statue of the deceased nobleman, draped in the robes of a peer of the realm. The statue is distinguished by grace and perfect repose. The tomb is executed in alabaster and coloured marbles, and is enriched with a series of arch-headed panels, supported by rose antique marble columns and carved capitals. These panels are filled with shields, on which are marshalled the armorial bearings of the Lyttelton family. In addition to the heraldic panels, there are two large circular cusped panels, one on either side, deeply moulded and filled with bas-reliefs, illustrating the Entombment and Resurrection. The cornice and base mouldings are executed in a beautiful bronze-coloured marble from the Shropshire quarries of the Earl of Bradford. The late Sir Gilbert Scott was commissioned to prepare the design, which has been executed by Mr. Forsyth.

NEWBURY.—The memorial to Viscount Falkland, who fell in the Battle of Newbury, will be unveiled by the Earl of Carnarvon on Monday next. On Friday week the huge block of granite forming the base was laid, and on Monday week the shaft was safely placed and fixed in position by the borough dignitaries. The block of granite forming the base weighs upwards of 11 tons, another block placed upon it weighs 5½ tons, and the shaft about 6 tons. The monument rises to a height of some 30 feet, and occupies an elevated site at the corner of Wash-common, opposite the Gun Inn. Carved on the bases are three inscriptions, one being in English, and the other two in Greek and Latin, besides monograms, &c. The design was furnished by Mr. James H. Money, and Messrs. Freeman, of Westminster and Penrhyn, are the contractors. A pleasing incident of the undertaking was a gathering of the contractors' men at the Black Boys Hotel, on Wednesday week, when a supper was provided for them at the cost of a few gentlemen interested in the project.

The new Waterloo station of the London and South-Western Railway is approaching completion, although a few months will probably elapse before it it is ready for opening. Much of the viaduct has been finished, and the long platforms are being laid as quickly as possible. Considerable progress has been made with the iron, wood, and glass roofing.

The work of restoring to the original design the eastern portal of the group of three, forming the north transept entrance to Westminster Abbey, has just been completed. The materials used are Chilmark stone and bird's-eye marble. We illustrated Sir Gilbert Scott's design for treatment of the three porches, now partially carried out, on May 3rd last.

CHIPS.

On Monday week the memorial stones of a new Primitive Methodist chapel were laid at Wolstanton. It has been designed by Mr. A. E. Wood, of Tunstall, and the contractor is Mr. Proctor, of Tunstall. The chapel will accommodate 800, and the cost will be £2,500, including site. The front will be of blue bricks, with stone dressings, and terra cotta will be introduced.

A sailors' home was opened in Luton-street, near the Wellington Dock, Liverpool, last week. There is accommodation for 140 seamen and ten officers, and in addition, rooms are set apart for the offices of the Marine Department of the Board of Trade and for banking purposes. Every room is naturally lighted, and extreme precaution has been taken against fire. Upon the 2nd and 3rd floors hose are available, and for the purpose of escape special fire-proof staircases are provided at the end of each wing. The architects are Messrs. Hoult and Wise, and the buildings have been erected by Messrs. Jones and Sons, contractors, of Pleasant-street, Liverpool. The sub-contractors have been Messrs. Watts and Co., Mr. George Peet, and Messrs. Ray and Miles, all of the same borough.

A Local Government Board inquiry was held at Horsforth, near Leeds, on Friday last, before Mr. J. T. Harrison, C.E., when a lamentable amount of neglect by the local board officials was deposed to by memorialists and other witnesses. It was stated that the whole sewage of the town ran down channels on the surface of the main streets, that the ashpits were running over with filth, and had not been touched for years, and that subsoil water percolated into the cellars of houses. The inspector visited various parts of the district, and afterwards declined to hear evidence as to the sewerage arrangements, for he should report to the central authority, from personal observation, that these and the ashpits were as bad as they could possibly be.

Amended plans for the new workhouse, prepared by Messrs. Creeke and Burton, architects, of Bournemouth, were accepted for adoption by the guardians of Christchurch, Hants, at their last meeting.

On Wednesday week the Church of St. Mary Magdalene, Winterborne Monkton, was opened after a complete restoration, under the superintendence of Mr. Butterfield. The east window has been filled with painted glass, by Mr. Gibbs, as a memorial. The restoration cost £2,000.

Mr. Basil Champneys is the architect of the new Divinity Schools, Cambridge, referred to on p. 227 last week, and not Mr. Blomfield.

The materials for the permanent wooden barracks in which the troops at Cyprus are to be housed are being delivered at the Royal Arsenal, Woolwich, and 400 tons (measured) have already been received. They consist of deals, supplied by contract from the works of Messrs. Lucas Brothers, near Yarmouth, where the huts have been all put together, and the several pieces marked to facilitate re-erection on reaching the new British station in the Mediterranean. The officers' huts are 60ft. by 15ft., and they are 9ft. in height under the eaves. There is also one 90ft. long, and much wider than the others, to serve for the officers' mess-room. Other contractors have undertaken to supply the huts for the non-commissioned officers and men.

At Bridgwater the work of laying the water supply pipes under the bridge, and also the construction of the storage reservoir and filtering beds, &c., at Ashford Mills, has just been commenced. The contractor for the last named work is Mr. Chamberlain, of Leicester, and the amount of his contract is close upon £10,000.

Extensive alterations are being made to Christ church, Belper. The work is being executed by Messrs. Hart, Son, and Peard, of London and Birmingham.

The Local Board of Health for East Dereham have accepted the offer of Messrs. Russ and Minns to supply gratis plans for the drainage of the district.

The new railway at Port Edgar and the works connected therewith, constructed by the North British Railway Company, were inspected by Colone Hutchinson on Monday. The undertaking was begun a year ago, under a contract by Mr. T. S. Hunter, of Edinburgh, at an estimated cost of about £30,000. The works consist of a landing jetty composed of timber, supported on piles, and measuring about 900ft. in length. The station is at a little higher level than the pier, and has a broad wooden platform. Beyond the jetty is a breakwater of whinstone blocks from Carlinnose quarry, North Queensferry. It extends seaward for a distance of about 1,300ft., and is finished with a coping of concrete. At the point of the breakwater is an iron lighthouse. On the shore side of the breakwater the railway is formed over a surface embankment consisting of slag. A new station has been constructed at a point about midway between Queensferry and Newhalls. The works were carried out under the superintendence of Mr. Bell, engineer.

Plans have been prepared by Messrs. J. W. Rowell and Son, of Newton Abbot and Torquay, for a new parish church for Shaldon, in place of the unsightly and dilapidated edifice now in use, which dates from 1641. The new church will be of an early type of decorated Gothic.

Intercommunication.

QUESTIONS.

[5496.]—**Figures in Perspective.**—Is there any rule for placing figures in perspective drawings, and if so can any one inform me of a book for same?—E. R. S.

[5497.]—**The Hall of Rufus, Westminster.**—Can any of your correspondents inform me whether a conjectural restoration of the Hall of Rufus at Westminster has ever been put forth? Also why the end principals of the present roof are quite free of the gable walls, and whether this occurs in any other examples? I have read Brayley and Britton's "Palace of Westminster," and the remarks of Dunnage and Laver in their work on Eltham (which are absurd enough), but can find nothing on above points.—J. A. RUTTER.

[5498.]—**The Lancet Style.**—Will one of your readers kindly tell me the chief characteristics of the Lancet period, particularly with regard to mouldings, vaulting, and spires?—STUDENT.

[5499.]—**Thrust of Vault.**—I should be glad to know a simple way of finding the thrust of a groined vault against a pier.—W.

[5500.]—**Arch.**—What is the simplest way of finding the equilibrium of an arch?—W.

[5501.]—**Perspective.**—In the BUILDING NEWS, Sept. 22nd, 1876, "Intercommunication Column" (4583), "W. S. S.," in reply to "Inexperium Perplexitum" furnished a sketch in explanation of some points in perspective. May I further trouble "W.S.S." to explain the mode of obtaining the representation of the height of ridge, as I fail to understand the diagram shown. The difficulties I encounter are the meaning of the 40' marked on the elevations (perspective and geometrical), the points A.V.P. 1, A.M.P. 2, A.M.P. 1, A.V.P. 2, on the vertical trace of the vanishing plane line, and the meaning of the arc described by the arrow point on the ground plan. What is the mode for obtaining the proper height of chimneys? What distance should the point of sight be from ground plan, and what height should the base line be from the line receiving the vanishing points Nos. 1 and 2? Explanations on these items will greatly oblige—H. H.

REPLIES.

[5461.]—**Stamped Agreements.**—"G. H." very naturally objects to be set right in the above matter, but he should take a legal opinion before giving so decided a dictum. The universal custom of any profession is no answer to statute law. My own custom was exactly as "G. H." names, but I found my error by practical experience in the law courts. On production of a plan found to be unstamped, my client had to pay £10, although the opposing party waived objection, the clerk of the court being the Crown representative, and bound to take cognisance of such matters. I should be glad if "G. H.'s" contention were correct, for I have many contracts that I am concerned for not yet wound up, and my responsibility (for my clients) still undischarged. As the great majority of agreements for buildings fortunately are not brought into court, the question is not often tested, so that practically, I suppose, it does not matter very much, but this would equally be the case if the same were not stamped at all. The Stamp Act was revised and amended thoroughly some 8 or 10 years ago, I believe; I cannot tell the date, but any solicitor could advise. The wording and stipulations are very precise, and state distinctly that all deeds or papers signed as part of or referring to any contract must bear a stamp. It has been ruled in the courts that documents or plans and agreements if bound up or taken together at time of execution, may be carried under one stamp—if taken separately, shall bear a separate stamp; such duty in the aggregate not to amount to more than 10s. (See case of Rose *v.* Lloyd, Queen's Bench, 1872).—B.

[5461.]—**Stamped Agreements.**—In reply to "G. H." I would say that "B.'s" reply is not misleading but perfectly accurate. Solicitors' practice goes for nothing in stamping. They are frequently the cause of documents being stamped wrongly. By paying a denoting fee of 10s. 6d. at Somerset House an official there will mark the necessary duty, and affix the denoting stamp, which is a Government guarantee that the stamping cannot afterwards be impugned. To be covered by a 6d. adhesive agreement stamp plans referred to in an agreement must be fastened together and annexed to the agreement at the time of stamping, or they may be fastened together by themselves, when they will require another 6d. stamp. If not fastened, each separate document, letter, or sheet of plans must have a 6d. stamp. This information has been obtained from Somerset House, and has been more than once published by me in your "Intercommunication Column," as the indices of your back volumes will show. The result of putting a 6d. stamp (adhesive or impressed) on the agreement when the plans were not annexed thereto would be this: that in a court of law the agreement could be produced as evidence, but the plans could not until a considerable penalty had been paid on each of them. I may add that at the Stamp Office, although the official may mark the duty erroneously, this will not enure to the benefit of the person paying the duty, and the legal correctness of the stamping is not guaranteed unless a 10s. 6d. denoting stamp is impressed in addition to the ordinary duty.—L.

[5488.]—**Strength of Wood Posts.**—"M." appears to have mis-stated the facts in his query. It is Hurst's formula that gives 342 tons for a post 12in. square and 5ft. 6in. long, and the formula in Spon's "Builders' Pocket-Book," which "M." says is from Tarn's "Tredgold's Carpentry," that gives 5,353 tons. The latter formula, it so happens, is Hodgkinson's, and is well known to be unreliable except for posts of great length as compared with the diameter. The formula adopted by Hurst starts with the crushing strength of very short posts, represented by C S as a maximum, and is reduced by the divisor, $1 + \frac{L^2}{4T^2}$, as the length of the post is increased. I do not know of any experiment on the breaking weight of posts of the exact size given by "M.," but if he will apply Hurst's formula to the experiments made by Mr. Kirkaldy on the occasion of the visit of the architects at the general conference, as related in the BUILDING NEWS 14th of June last, he will find that they agree very closely—viz., a Dantzic fir post 5·644in. diameter = 25in. sectional area and 4ft. 2in. long—broke with 117,620lb. = 52¾ tons nearly. This calculated by Hurst's formula, taking C = 2·5 for fir and 2 instead of 4 as a division of L^2, the post being cylindrical, has—

$$\frac{C\,S}{1 + \frac{L^2}{2T^2}} = \frac{2{\cdot}5 \times 25}{1 + 2 \times 31{\cdot}85} = \frac{}{17{\cdot}36} = 50 \text{ tons nearly.}$$

This shows that the formula cannot be far astray, and that 342 tons is probably the breaking weight of a fir post 12in. square and 5½ft. long.—J. S.

[5488.]—**Strength of Wood Post.**—The resistance to crushing for red pine is about 2 tons or 2·20, as given in Hurst. The formula quoted is Rankine's. Tarn's rule as stated is correct for pillars of the dimensions given, and "M." may rely upon it. Thus the pillar is 12" × 12" = 144 square inches, and 144 × 2·20 = 316·80 = crushing weight. Of course this is the total resistance to crushing. The pillar would support a safe load of one-tenth this, or, say, 31 tons. The discrepancy complained of by "M." is easily explainable. The formula he quotes is intended to apply to pillars which yield by bending only, and is not intended for a pillar of the stated dimensions. A great deal depends also on the nature of the specimen and the straightness of grain—*e.g.*, I should not like to trust half 316 tons upon a pillar 12in. square and 5ft. 6in. long if the grain was interfered with by knots, which seriously impair the value of the constant.—G. H. G.

[5493.]—**Dublin.**—"Anglian" will probably find himself disappointed in his quest of buildings worth sketching in Dublin. It is not strong in this respect. Christ Church Cathedral is best worth study, where much unique and beautiful work has been reverently preserved by Mr. Street in the late bold restoration. St. Patrick's Cathedral has a few fragments of ancient work which escaped the wholesale builder's mutilation of 1864. St. Andrew's has some fragmentary remains. St. Doulogh's Chapel (4 miles from Dublin) is a quaint and curious little building. After this "Anglian" must go wider a-field for mediæval buildings. Glendalough, Cashel, Trim, Clonmacnois, at considerable distances, possess ruins of interest. Many houses in the city possess fine fragments of 18th-century Renaissance decoration, chiefly in stucco work, wood carving, and mantelpieces. Guide-books are misleading and useless to the professional student. If "Anglian" thinks it worth while to apply to the BUILDING NEWS for writer's address, he would find him, if he calls on him, delighted to give any information in his power.—HIBERNIAN.

[5493.]—**Dublin.**—The following list, I think, comprises all the buildings worthy of study in or near Dublin:—St. Patrick's Cathedral; Christ-church Cathedral; St. Andrew's Church, consisting of 13th, 15th, and 16th century work, and containing interesting tombs and font; St. Michan's Church, a 17th century building, with a massive ancient tower and fine organ, on which Handel played. St. Patrick's Cathedral is surrounded by a number of decayed streets, known as the Liberties, in which squalid locality may be seen old houses of the Queen Anne period, with moulded gables and oak-panelled rooms. Molyneux House, Peter-street, is a quaint old building of this date, not improved by recent repairs. The public buildings, which were principally erected at the close of the last century, will be first from their commanding position to claim "Anglian's" attention. They are: The Bank (formerly the Houses of Parliament), the Law Courts, the Custom House, the Royal Exchange, Trinity College, and the Post-office. The mansions inhabited by the nobility before the Union have been appropriated to various unsuitable purposes, and are consequently much altered as to their interiors. Leinster House (now the Royal Dublin Society's House) is the finest of these, and contains some very fine apartments with handsome plaster ceilings and chimney-pieces. The plaster work in the Dublin houses of this date is worthy of attention. It was executed by Italian workmen who had settled in Dublin. The ceilings of the Royal Hospital and Lying-in Hospital chapels are considered their finest works. The ironwork of the railings, lampstands, &c., is also excellent of its kind. The Castle is a red brick building, with stone dressings of the same date, and its chapel a very interesting example of the Early Gothic revival. Three interesting excursions may be made to Howth, Malahide, and Lusk, which are all situated on the Great Northern line, a short distance from Dublin. At Howth, there is the castle, a 16th century building, much modernised, but worthy of a visit; the ruined church and college, which have curious Late windows, a cromlech, and St. Fintan's Church or oratory. On the island of Ireland's Eye, off Howth, there is a very early church, described by Petrie. At Malahide, there is the castle, a much modernised building, but containing some interesting apartments, one of which is elaborately panelled in black oak; in the hall there is a minstrel's gallery in the same style, and the castle contains a magnificent collection of pictures, furniture, and articles of *vertu*. Near it there is a ruined church, with interesting 15th and 16th century detail. Within easy walking distance of Malahide lie Swords, with its round tower, and remains of archiepiscopal palace, and St. Doulough's with its stone-roofed church and well. At Lusk there is a round tower, an ancient church tower, and some interesting tombs. At Cloudalkin, about four miles from Dublin, on the Great Southern and Western Railway, there is a very perfect round tower. To the south of Dublin, Bulleck Castle, Dalkey Castle and church, and the very early church at Killiney, which are all easily accessible by railway, may be visited. Should "Anglian" have time, he may make excursions to Kells, where are two fine crosses, a round tower, and St. Columb's stone-roofed house; Kildare, with its round tower and 13th century cathedral, now being restored by Mr. Street; Glendalough, with its numerous antiquities; and Drogheda, near which are Mellifont Abbey, Newgrange tumulus, and the crosses and round tower of Monasterboice. With regard to the modern buildings of Dublin, the Hibernian and Munster Banks, the numerous insurance offices in Dame-street and Sackville-street, St. Augustine's Roman Catholic Church, the Kildare-street Club, and the Engineering School in Trinity College, appear to me to be the most worthy of "Anglian's" attention.—G. W. M.

The new aquarium at Tynemouth, erected from the designs of Messrs. John Norton and P. E. Macey, of Old Bond-street, W., was opened on Wednesday week. Full particulars of the building and an illustration of the façade facing the sea, appeared in the BUILDING NEWS of January 21st, 1876 (p. 60, Vol. XXX.).

New board schools have just been opened at Brandon, Norfolk. Mr. J. T. Lee was the architect, and Mr. R. Skipper the contractor. The cost has been £4,000.

New schools, erected by the Gateshead-on-Tyne School Board, were opened at Law Fell on Wednesday. They comprise schoolroom, a large class-room, a mistress's private room, children's cap room and lavatory, and two rooms for the resident caretaker. In the playground are the children's conveniences and a large covered play shed. Externally the schools are executed in red bricks, with stone dressings, slated roof and red ridge tiles. The works have been carried out by Mr. Thomas Robson, builder, of Low Fell, and Mr. Edlington has acted as clerk of the works. Mr. Thomas Oliver, of Newcastle, is the architect.

A case of rattening has occurred in a brick yard near Sheffield. Mr. Mayne, brickmaker, Sharrow Vale, having employed a non-union man, it was on Monday discovered that about two thousand bricks which had been left to dry had been trampled out of shape when soft.

A peal of twenty-eight silver bells has arrived at Eaton Hall, near Chester, the seat of the Duke of Westminster, for hanging in the tower of the chapel attached to the hall. The largest bell—which weighs more than 2 tons, and is in the key F, the complete set making two complete octaves and three notes above—bears the inscription:—"This peal of 28 bells was cast at Louvaine for his Grace the Duke of Westminster, by S. Vancterschodt, A.D. 1877." The referee appointed to certify to the tone of the bells was Dr. Stainer. It is said that the cost of the peal was £30,000.

A bust of Mr. John Bright, M.P., has been executed in white marble by Mr. Burnand, and is to be presented to the town of Dundee.

The ceremony of laying a memorial stone for a new Baptist chapel took place, on Tuesday, at Bedale. The chapel is to be built of red bricks with blue-black stringings and stone dressings. The cost of erection will be about £1,300, and of site £175. The structure will accommodate comfortably 250 persons. Mr. J. P. Kay, of Leeds, is the architect; and the work will be carried out by Messrs. Thackray, contractors, of Woodhouse, Leeds.

It was determined at a meeting of the Church Restoration Committee, at Caverswall, North Staffordshire, to adopt the recommendations contained in the report of Mr. Chas. Lynam, architect, of Stoke-on-Trent, including the renewal of roofs, re-erection of parapet to nave, and addition of same to aisle, removal of accumulations of earth round external walls, and opening up original base mouldings, the re-instatement of floor throughout, taking down of western gallery, and rebuilding of south porch in open timber work.

bronze, glass, pottery, coins, gems, and fragmentary terra-cotta tablets. One of the most attractive objects in this first instalment of the collection is described as an incense spoon 6in. long, having an elegantly tapering handle and extremities; but the most valuable article is the 8ft. or 9ft., in three or four different pieces, of the already celebrated bronze plates, of which Mr. Rassam has a length in the whole of about 180ft. These plates are scrolls or belts of metal nearly 1ft. wide, covered with bas-reliefs, which are arranged in tiers, and are devoted to representations of the martial and other events of the reign of Assur Nazir Pal, about the year 900 before Christ.

Helliwell's Patent System.

OF AIR and WATER-TIGHT GLAZING, WITHOUT PUTTY, and without exposing any outside woodwork to paint, and NEW SYSTEM of COVERING ROOFS.

The fasteners are brass or copper. The peculiar arrangement of the glass covers the whole of the woodwork, and only the small fastener is visible; herefore the roof is indestructible, and outside painting unnecessary. The squares of glass can be easily removed, and the whole taken out and cleaned by any inexperienced person. Breakage is impossible except through carelessness or accident.

The glazing is more air-tight than the old putty system, yet any amount of ventilation can be given.

Old roofs may be re-glazed on this principle, and roofs are covered with slates or zinc on this system.

Extract from BUILDING NEWS:—"Mr. T. W. Helliwell, of Brighouse, has recently patented and introduced a new system of glazing and covering roofs, which is certainly superior to anything of the kind we have seen before . . . . and it will, in our opinion, supersede any other system before the public."

Important references and all particulars from the patentee, T. W. HELLIWELL, Brighouse, Yorkshire; and 19, Parliament-street, London.—[ADVT.]

Trade News.

WAGES MOVEMENT.

BRISTOL.—At a meeting of plasterers, held on Monday, the strike was concluded, and votes of thanks were passed to those employers who have conceded an advance in wages.

NEWCASTLE-ON-TYNE.—On Friday evening a meeting of employers in the building trades of Newcastle and Gateshead was held at the Mechanics' Institute, Newcastle, and deputations from the masons and joiners were asked to confer with respect to the proposed reduction of wages. The first deputation was from the masons. A discussion of the subject took place, and several of the points at issue were amicably disposed of. The workmen consented to payment by the hour instead of weekly wages, and also to a rate of wages of 8½d. per hour—equal to a reduction of between 3s. and 4s. on the present weekly rate of pay. As to piecework no agreement was come to, and the conference had to be adjourned. The joiners' deputation asked the employers to reconsider their proposed reduction of wages from 8½d. to 7½d. per hour. The employers replied that it was for the workmen to make any suggestion or concession. The deputation reported the result of their interview to the general body of joiners, and it was by a large majority agreed that a former resolution against accepting the reduction should be adhered to. The men accordingly left work on Saturday, and are now on strike.

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FOR BURNING BRICKS, &c.,
(Patented in England, France, and Germany),
Effect a Great Saving in Charging and Discharging, and 50 per cent. of Fuel.
Apply to ROBERT LANCASTER, Leeds Brickmaking Company (Limited), Armley, Leeds.

TENDERS.

BRIGHTON.—For the erection of offices, warehouses, &c., in Queen's-road, for Robert H. Penney, Esq. Messrs. Holford and Clayton, North-street, Brighton, architects:

Lockyer	£2,250
Cheesman and Co.	2,2[illegible]
Botting	2,240
Nash and Co.	2,170
Barnes	2,094
Newnham	2,062
Garrett (accepted)	2,057

BRIGHTON.—For building additions to factory, with stabling and cottages, in rear of No. 20, Middle-street, Brighton. Messrs. Holford and Clayton, architects:—

Newnham	£1,307
Lockyer	1,278
Cheesman and Co.	1,180
Botting	1,150
Barnes (accepted)	1,090

HASTINGS.—For alterations to premises Nos. 1, 2, and 3, Claremont, Hastings, for Mr. E. Plummer. Mr. W. L. Vernon, architect:—

Accepted tenders:

Eldridge, W. H. (alterations and additions at rear)	£1,223
Mills, Henry (new front and alterations, &c.)	900
	£2,123

HASTINGS.—For new house, Clive Vale, Hastings, for J. Osborne, Esq. Mr. Vernon, architect:—

Parks, D.	£1,722
Eldridge, W. H.	1,645
Harman, E. and C.	1,641
Vidler, Alfred (accepted)	1,604

HIGHGATE.—For laundry, mortuary, &c., at the Highgate Infirmary, for the Guardians of the Holborn Union. Mr. H. Saxon Snell, architect:—

Kirk and Randall	£7,950
Crockett, W.	7,745
Perry and Co.	7,543
Wall Bros.	7,500
Brass, W.	7,436
Chappell, J. T.	7,370
Mowlem and Co. (accepted)	7,200

ILFRACOMBE.—For pair of small villas, "The Sloleys," Ilfracombe, for Messrs. W. and R. Whitehorn. Mr. W. M. Robbins, architect; quantities supplied:—

Jolliffe	£996	13	0
Parkyn	981	0	0
Brooks and Rowe	973	0	0
Horwood	964	0	0
German	953	0	0

LANGPORT.—For the erection of cemetery, chapels, boundary walls, &c., Langport. Mr. Henry Hall, architect, 19, Doughty-street, London, E.C.:—

Webb, Curry Rivell	£1,218
Davis, Langport	1,185

MAIDENHEAD.—For erection of new offices and dwelling-house at the Brewery, Maidenhead, for Messrs. J. Fuller and Co. Messrs. C. Cooper and Davy, architects; quantities supplied:—

Groome, J. P., London	£2,459
Claridge, C., Banbury	2,340
Kempsell, J., Winkfield	1,990
Woodbridge, W., Maidenhead	1,897
Jones and Co., Gloucester	1,890
Cox, C. W., Maidenhead	1,889
Stephens and Bastow, Bristol	1,880
Silver and Sons, Maidenhead	1,864

LEWES.—For the erection of stables at Cook's Bridge Lewes, for James Nightingale, Esq. Messrs. Hall, Grylls, and Wilcocks, architects; quantities supplied:—

Somerville and Hill	£1,126	0	0
Peters and Redford	1,062	10	6
Earnie	1,053	15	8
Longley	1,050	0	0
Beale	963	0	0
For fittings for the above:			
Musgrave and Co.	500	0	0

NEWPORT, MON.—For the erection of an inclosing wall of Pennant stone to an addition to Newport cemetery, for the Town Council:—

Jones and Perkins (accepted)	£481

NORTH CADBURY.—For farm-house and homestead for the Tythe Farm, North Cadbury. Mr. H. Hall, architect, 19, Doughty-street, W.C.:—

Pitman and Son, Stoke-sub-Hamdon	£2,000
Francis and Son, Castle Cary	1,9[illegible]
Seward and Norris, Frome	1,886
Cox, Yeovil	1,760

NOTTINGHAM.—For the demolition and re-erection of the Town Arms Inn, Red Lion-square, Nottingham. Mr. S. Dutton Walker, F.S.A., architect:—

Messom	£995	0	0
Marriott and Wartnaby	990	0	0
Fox	984	0	0
Dennett	976	15	0
Underwood	967	18	0
Tutin	959	0	0
Hollingsworth	933	0	0
Ireson, Wade, and Gray	925	0	0
Jelley	890	0	0
Bailey	884	15	0
Harrison	880	0	0
Roberts and Perkins (accepted)	847	0	0

OSWESTRY.—For lowering the boundary wall of Trinity churchyard and erecting thereon iron palisadings. Mr. Spaull, architect:—

Mason, Perseverance Works, Oswestry	£85	10	0
Clay and Sons, Ellesmere	63	0	0
Smith, R. T. and Co., Whitchurch	62	10	0
Ellis and Son, Oswestry (accepted)	61	15	6

SOUTH PETHERTON.—For boys' school and residence at South Petherton. Mr. Henry Hall, architect, 19, Doughty-street, W.C.:—

Langdon and Pole, Minehead	£1,780	0	0
Trask, Norton-sub-Hamdon	1,690	0	0
Hallett and Mumford, Crewkerne	1,5[illegible]	1[illegible]	0
Lye and Son, Crewkerne	1,469	0	0
Staple and Son, Stoke-sub-Hamdon	1,367	0	0
Walter, South Petherton	1,35[illegible]	0	0
Rowsell, Stoke-sub-Hamdon	1,320	0	0
Sanders, South Petherton	1,319	0	0
Davis, Langport	1,310	0	0
Pitman and Fane, Stoke-sub-Hamdon	1,300	0	0

ST. LEONARDS-ON-SEA.—For new house, No. 41, St. John's-road, St. Leonards-on-Sea, for Mr. E. Plummer:

Smith, W. H. (accepted)	£830

ST. LEONARDS-ON-SEA.—For new house, No. 42, St. John's-road, St. Leonards-on-Sea, for Mr. E. Plummer:

Parker, J. C. (accepted)	£825

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Our Office Table.

MANY people were surprised when we announced a short time since that Sir Edmund Beckett, Q.C., was elected architect to the Diocese of York in the place of Mr. G. E. Street, R.A. The manner in which the new official wields his recently-acquired power is not less surprising. We heard of an instance the other day in which a well-known architect and fully-competent member of the Institute submitted to the diocesan architect in the ordinary way plans of and specification for a new building to be erected in the diocese of York. The architect had his drawings returned, with remarks and corrections, as well as a foot-note to the effect that generally speaking the manner in which the work was shown was altogether wrong, while the specification was so interlined and altered that it was to all intents and purposes a fresh document. Repeated references were made to Sir Edmund Beckett's "Book on Building" as a guide to the architect, by the study of which he might correct his faults and learn his trade. So displeased was the architect in question that he at once sent up drawings and specification to an eminent member of the profession in London for his opinion, without knowing at the time who the York diocesan architect really was, but thinking, of course, that at any rate he was a professional man. The plans and specification were returned from London, with the intimation appended that not only were they both correct, and such as any ordinary builder could at once readily understand, but that the remarks made upon them were not very far short of being nonsensical. The humorous side to this question may be all very well in its way, like the technical knowledge of amateur architects, but to the professional man dealing with an ordinary committee or client the subject would usually, under circumstances such as we have described, become far from pleasant. A young architect, for instance, with perhaps his first commission, would cut a sorry figure if his plans and papers were returned to his employers cut about like those we refer to, and that probably notwithstanding their substantial correctness.

IN accordance with a memorandum issued by the Metropolitan Board of Works just prior to the recess, that no inscription should be placed upon the pedestal or supports of Cleopatra's Needle without being first submitted to and sanctioned by the board, certain stones in the masonry which will support the obelisk have this week had to be taken down and replaced, the reason alleged being that on one were engraved the figures "1878," and others in the third course were sunk for a panel to be hereafter filled with the principal inscriptions. It has been decided that the sphinxes to be placed on the bases—each 14ft. 10in. × 10ft. 9in. at the top—on either side of the monolith, are to be casts in bronze from genuine Pharaonic monuments. This settlement of the accessories' difficulty is probably the most satisfactory that could have been devised, and meets the objections felt against modern antiques in a satisfactory manner. The obelisk has now been raised nearly to the full height proposed—48ft. above the pavement level—before the operation of swinging is undertaken.

AN anomaly in building is presented just now in the case of the Assay Office in Wall-street, New York, where may be seen an iron building owing its safety to wooden shores and girders. General Steinmetz, formerly Superintendent of Repairs on Public Buildings, discovered when in office that the columns and girders of this building—one of the oldest iron buildings in New York—had become so affected by the vapours and fumes of the acids used in assaying as to be presumably untrustworthy. His reports on the security of the building were accompanied by scales of iron two or more feet in length, which were easily detached from the iron columns. On the strength of these representations the floors of the building were about a year ago strengthened by yellow pine girders and posts. Mr. Mason, the assayer, does not believe that the vapours of any acids used are the cause of the trouble, but thinks a leakage from the acid tanks in the upper story of the building has been the cause of the corrosion.

IN a letter to a Birmingham daily journal "An Architect" asserts that there is no chance of escape for inmates should fire break out in many of the lofty buildings now in course of erection in Birmingham. Nothing, the writer declares, would induce him to pass a night in many of these edifices—the floors all timber, without the precaution of counter-ceilings; walls in many cases of 4½in. brickwork, frequent studded partitions, which invariably feed a fire; a number of stories carried on iron columns over shops stored with goods in which combustion might at any time take place. In framing the bye-laws recently passed by the Birmingham Town Council for the regulation of new buildings a very grave omission has been made, but one that can and ought to be at once rectified, to the effect that shops having sleeping rooms above them should be protected by a ceiling of fireproof material, such as arching in brickwork or concrete; and that all buildings above a certain number of stories in height should have several of these arched floors—say, each alternate floor—and that all staircases should be inclosed in brick walls of sufficient thickness. By these means the progress of a fire would be stayed until assistance arrived, and would be confined to the rooms in which it broke out.

MR. DAVID COUSIN, architect, who for many years occupied an important position in connection with the Edinburgh municipality, died a fortnight since at Sans Souci, Louisiana, while upon a tour through the United States. Born in 1809, David Cousin was apprenticed by his father, a North Leith joiner, to the late Mr. Playfair, architect, of Edinburgh; and, although he started in business on his own account when in his 22nd year, Cousin retained throughout life the Grecian proclivities acquired when in Playfair's service. For many years after the Disruption Cousin was consulting architect to the Free Church of Scotland, and prepared the plans for many of their churches and lecture-halls. After having acted as assistant to Mr. T. Brown, superintendent of works to the city of Edinburgh, Mr. Cousin succeeded to the office in 1847, and twenty years later took into partnership Mr. John Lessels, in conjunction with whom the great scheme of city improvement, including the laying off of Chambers' St. Mary's, and Jeffrey's-streets, was carried out. Two or three years since he retired from city official work, leaving Mr. Lessels sole architect to the trustees. As architect to the Ecclesiastical Commissioners, Mr. Cousin was for some time intrusted with the care of the city churches; and it was under his supervision that the renovation of Old Greyfriars and of the west end of St. Giles' Cathedral was carried out. Of late years Mr. Cousin was professionally employed in connection with feuing operations.

THE late Mr. John Ashdown, whose death was noticed by us last week (page 230), commenced practice, we are informed by "W. F. P.," in partnership with the late Mr. Frederick Wehnert, February 24, 1852, at 42, Charing-cross, now a part of Messrs. Cocks and Biddulph's Bank. Mr. F. Wehnert died in 1871, and his memoir appeared in the BUILDING NEWS on November 10 of that year, giving a detailed account of works designed and carried out under the joint superintendence of Wehnert and Ashdown during their partnership from 1852 to 1857, in which year the business association was dissolved.

THERE has been established lately in Baltimore the second factory in the country for making bricks by steam—the other establishment being in Washington—which is said to be able to make two hundred thousand bricks each day. The clay, after it has been passed through iron rollers which pulverise the small stones and reject the large ones, is carried to the top of the building, and thence falls into the disintegrator, which makes 450 revolutions per minute. Here it is reduced to a fine powder, and passes off into a pipe, where, by the addition of steam, it is moistened enough to give to its particles the proper cohesiveness. This pipe feeds a wheel furnished with moulds, which, in the two revolutions it makes each minute, turn out 232 bricks. As the wheel revolves the bricks drop out on to an endless belt, which carries them to a shed some 50ft. away, where they are loaded by hand upon small cars, which are rolled into drying ovens, and allowed to dry there during five hours, the dampness in these ovens being constantly withdrawn by an exhaust fan. After this they are stacked in kilns and fired.

THE Assyrian antiquities recently brought by Mr. Rassam to this country, and which are exciting the enthusiasm of archæologists to a degree unknown for several years, are being gradually prepared for display in the galleries of the British Museum. One case has already been temporarily arranged in the central Assyrian room. It contains 20 or 30 specimens in

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THE BUILDING NEWS.

LONDON, FRIDAY, SEPTEMBER 13, 1878.

THE ASTON PUBLIC BUILDINGS COMPETITION.

LAST week we announced that the Local Board of Aston, near Birmingham, had adopted Mr. Alfred Waterhouse's report upon the nineteen designs sent in for the new public offices and library, in which he recommended three designs for the premiums offered. These were respectively: "Model Plan," by Messrs. Alexander and Henman, Stockton-on-Tees; "Dignitas," by Mr. J. G. Dunn, Birmingham; and "T.," by Mr. T. Proud, of the same town. The board have, we understand, communicated with the authors, and have selected the design with motto "Model Plan," subject to certain conditions of cost. The plans have been exhibited during the past week, and comprise a variety of arrangements to meet the rather exceptional form of site. The instructions recommended a certain location of the departments, the chief of which were that the basement should be devoted to the housekeeper's apartments, fire-engines, stores for corn and hay, and the heating apparatus; the ground floor to the sanitary, surveying departments, and library; and the first floor to the clerks' offices, board and committee-rooms. A schedule of dimensions was supplied. Swimming and private baths were to form a separate building, and stabling, with other conveniences, were to be provided also, as a detached block. From an examination of the plans, we find the competitors have generally followed the suggested schedule, though a few have more boldly interpreted the requirements. We take the premiated designs in order. "Model Plan" (Messrs. Alexander and Henman), shows the public offices in the corner block between Albert and Witton-roads, the principal frontage being obtained towards the latter. The free library adjoins on this side, though its main bulk forms a return on the north side. In the rear also are the stables detached. The baths also form a distinct block, facing Albert-road. Of the propriety of this arrangement there can probably be no doubt. As in many other cases, the authors locate the hall and staircase at the inner angle of the main block, and place their entrance on the Witton-road side, which wing is traversed by a corridor lighted at the end. The surveyor's department, including office, drawing office, and plan room, occupies the external angular space between the two frontages, the drawing office forming an irregular apartment of an obtuse-angled shape, lighted on both frontages, and approached directly from the hall at the end of long corridor. The acute angle of the building forms an octangular tower externally, and is made the plan-room on the ground floor leading directly out of the drawing office. The building surveyor is provided for on the Albert-road front, and is approached also from the hall. The rate-collector is situated on the other side of entrance, lighted from Witton-road, and the medical and sanitary officers' testing-room make up the wing on this side. At the end of corridor also is placed the lavatories and water-closets. On the first floor are placed the clerks' offices, committee-room, and strong room, over the rate-collector's, while the angle over the surveyor's department becomes a board-room and antechamber—the former occupying the corner, and in shape resembling somewhat an irregular pentagon. There is little to find fault with in this arrangement of the offices; the hall and stairs are roomy, and well lighted, and a waiting-room is got near, the surveyor and rate-collector are easily accessible, as they should be, though we should have liked another entrance to the sanitary department—the testing-room would have been a good place for one, and have divided the building from the reading-room more thoroughly. We have one fault to find with the reading-room and libraries, and that is they are wanting in concentration, and the corridor on the further side is particularly awkward and wasteful at the angle between the reading-room and lending library. As we have said, the baths face the Albert-road, and measure 80ft. by 50ft. A lean-to roof surrounds the swimming bath. The private baths form a distinct though attached front block. The authors have treated their main elevation in an ornate Renaissance, though in parts it is more Elizabethan than French. The entrance in Witton-road is emphasized by a lofty tower piled up with curved roofs and dormers, giving it an affected if not feeble character—certainly overdone. In other respects there is a pleasing breaking up of the elevation, and the angle towers, with their concave roofs, give variety. The perspective is well drawn and coloured, red brick and stone dressings and green slates being the prevailing materials employed. On the whole a simplification of planning is evident, the departments have been well disposed, and the sections and details are well studied. The cost is estimated as follows:—Board-room and offices, £12,500; library, £3,500; baths, £4,000; stables and outsheds, 1,000; total, £21,000. The omission of the tower would about bring it within the contemplated outlay of £18,000.

In "Dignitas" (Mr. J. G. Dunn) the library forms a continuation of the Albert-road frontage, which is the longest, while the wing towards Witton-road is short. The baths are placed also in Albert-road, detached, and standing at right angles to the road. In this plan we notice a better provision of entrances, there being two (one in each road) to the offices, and another for the libraries. The surveyor's department occupies the angular portion of the two wings, the rate-collector is placed at the Witton-road end, and the sanitary inspector at the Albert-road end of the offices. There is something to be said for this allocation of departments, though a longer frontage is necessary. The stairs form the inside angle, and are compactly arranged at the junction of the two corridors, which latter are lighted at the back, where the lavatories and stairs also project and form a rather broken line. On the first floor, over the surveyor's department, are the clerks' offices, and the committee-room occupies the corner, though for what purpose the circular turret is added is a question hard to answer. The board-room and reference library are approached from a narrow back corridor. The landing and stairs are compact, but the corridor is ill-lighted at the turn. We note a private passage for the use of the surveyor between his own room and the drawing office, and this is requisite. In the plan of the baths we remarked a clever distribution of the entrances for men and women, the attendants' and waiting-rooms being economically contrived in the centre. Many of the other plans, we observe, are very deficient in this respect. The situation of the corn and straw stores below the library is certainly objectionable. While we are anxious to acknowledge merits we are bound to say the elevation and perspective fairly stagger us by the feeble character of the design and the inaccuracy of the perspective drawing. The author's Gothic is of the "used-up" kind of which we see many examples in Birmingham. The alternative design is a trifle better, and it is a pity the author has spoilt a fairly good plan by such elevations. The estimated cost is £18,044.

Of the plan "T." (in a circle (T. F. Proud), awarded the third prize, we may say it has only just got it. There are some merits in it certainly. The offices are well separated, and are located along Witton-road, where there is a centre tower, massive and dignified in proportions, but spoilt by the toy-like pinnacles of the top corners. The surveyor is given the angle up to the main entrance, the building surveyor is on the return side, but the inner angle is very awkwardly planned to give apparently a cross passage. The rate collector's and sanitary offices are on the other side of entrance. Above are the clerks' offices, with a corner board-room, 57ft. by 27ft., and committee-room on return. The reading-room, 50ft. by 40ft., is lighted at ends, while the lending library, 30ft. by 40ft., is lighted at end and by a skylight, and an entrance divides the two departments of this block. The main objection we have to the plan is the straggling of apartments round the corner, and a want of coherency in the parts. The private baths and their passages are wasteful. Architecturally the perspective shows some good parts; the principal departments are emphasized by different treatment, but on the whole it is affected in style, and the parts unpleasingly combined. In fact, the Gothic is of that sort of which we are all surfeited—a pompous mixture of French and Italian—the Gothic-esque of town halls. The entrance tower is rather lumpy in effect, the turrets are weak, and the roofing and corner tower, crowned by a conical roof, hardly blend happily.

There are two or three other designs which so closely approach the premiated designs that we are not quite sure whether Mr. Waterhouse's report has considered them with that fulness they deserve. One of these is "Well Considered," in which we recognise the author of a striking design in the late Yarmouth competition. The plan has certainly merits. The entrance is at the corner, which is cut or canted off an open loggia, forming a pleasing rounding of the main frontages. The hall or entrance bisects the angle and leads to the two diverging corridors. The surveyor's department occupies the Witton-road front, the rate and medical officer's the Albert-road. The sanitary department is placed behind the corridor, and the principal stairs and lavatory are conveniently planned in line with the axis of entrance. We like the manner in which the end of the surveyor's corridor is managed; there is a useful lavatory and strong room between the drawing office and the spare room, and good intercommunication is shown between the rooms of each department—a point overlooked by some competitors. The author places the baths towards the Albert-road, round which are ranged the stalls, washhouse, boiler, and cart-sheds. The elevations are cleverly drawn, and the perspective pencil sketch is rendered in a species of Birmingham-Italian—a lofty tower and cupola rising above the entrance. "Pro Bono Publico," unlike many others, goes in for a rectangular plan, in which the angle of site is not considered as a controlling condition. The block of offices and the library face Albert-road, approached by a central entrance from which a symmetrical disposition of corridors leads, on one side being the surveying and on the other the sanitary and medical departments. The hall is very spacious—unnecessarily so—and the stairs form a projection in front of entrance. An extension is suggested by adding to the wings. The style is Elizabethan, with a large corner tower surmounted by a curvilinear-shaped cupola. There is evidence of merit in grouping of masses, but the coloured drawings are

poorly executed. The baths are well studied in the detail. The author calculates 835,000 cubic feet, but the estimate is only worked out at £18,000. This is probably meant as a joke. We must not overlook "Fleur-de-Lis"—a cleverly-drawn and picturesque design (in ink) in Continental Gothic. Some piquant bits of Gothic sketching are shown in the Albert-road elevation; the octagon end of stairs is made a feature, and the angle entrance has an imposing tower, well proportioned and massive. The ink perspective is spotty in effect. In plan there is not much to demand notice—the two wings are disposed, as usual, with corridors; the chief entrance is at angle, but turned curiously aslant with the return side; the hall is pronounced externally. The departments are tolerably distinct, with a separate sanitary entrance: this is desirable, but the lending and reference libraries are disposed lengthwise, with a lobby between, and the plan is not the most economical. By far the cleverest ink drawings are those of "Economy." The sharp perspective from a near point of view overpowers by its size, and transcends by its artistic handling the other drawings. The author selects Renaissance, though more English in detail than foreign, in which a lofty central tower of massive treatment, and of a type we have seen many of late, appears. There is much in the design to remind us of Mr. Collcutt's work. The library department occupies by far the largest portion of the area, and the pierced tower base, surrounded by a prodigious hall, is amazing. Of course, the surveyor and clerk, by this arrangement, are assigned the first floor, in which a central corridor, with steps in centre of its length, gives access to the offices. But we cannot patiently deal with this plan. It does not take the shape of the site, but forms a rectangular block, in which everything has been sacrificed to the exterior. The cubic contents of the main building are put down at 529,483ft. cube, summed out at the sum of £15,000, though the tower is not included in the estimate.

Of the other designs we can speak only briefly. "Black and White Triangles" has the inner corridor arrangement; the stairs and entrance are placed near the corner facing Albert-road; the surveyor is on ground floor, and clerks above. There appear to be many good points in the plan; good lighting, with end latrines, but the elevations spoil all. Why, for instance, the lofty tower, and emphasize nothing but a porter's room? "Opus" has a tolerable plan in some respects, but the corridors are not well lighted, and the baths are awkwardly grouped. The libraries, &c., form the Witton-road wing, with a centre entrance. The author puts his offices at 262,320 cube feet, worked out at £6,550. Does the author seriously mean this? Elizabethan in design, the elevations are certainly official-looking, of red brick and stone, materials that have been largely adopted by competitors. "Fidelitas" has a confused plan; the ground appears covered with ill-studied arrangements; the elevations are Gothic, educational in character, with a round angle tower and conical roof of singular proportions. We notice also "Pro Bono Publico" (2) another Gothic attempt of an early type, with some clever coloured sketches of hall and plunge-bath, and a canted corner entrance; but the offices are jumbled, and we cannot attempt to unravel the plan. "Cross in Circle" has an indifferent plan of usual form; there is a lack of distribution in the baths. "Hexagon in Triangle" is not so bad, but shows want of classification in the departments. "Au Fait" certainly belies its name as regards the planning—for instance, in placing the reading room in one wing, and the lending library in the other, and in separating the rate-collector and surveyor by putting them at the two opposite extremities of the building. No clerks' offices appear, and further examination is unnecessary. "Common Sense," unfinished, exhibits a labyrinthine arrangement of groined corridors, round stairs, and areas. We really cannot trace out the separate offices, or investigate access, &c. We may also mention "Plan" and "Forward," both exhibiting attempts at plan and design only worthy of tyros.

On the whole, the Local Board may consider themselves fortunate in the design selected for adoption. It has certainly all the elements of a well-thought-out plan, and of refinement in elevation; the entrance is well planned, good access to the principal offices is obtained, and the departments are distinctively treated. We are glad to see that the instructions to competitors provided a condition we strongly recommended not long ago—viz., that each design should furnish the nett cubical contents of each part, calculated from the basement floor, and including all walls and roof space, the height of roofs and towers being stated separately. Notwithstanding the absurd estimates of some competitors, the basis of a correct calculation in every case is thereby determined.

THE COMMISSION ON NOXIOUS VAPOURS.

THE Report of the Royal Commission appointed to inquire into the working and management of works and manufactories from which noxious gases and vapours are given off is now before us, and we may give here an outline of the results arrived at. One of the principal duties of the Commission was to ascertain the effect produced by noxious vapours on animal and vegetable life, and to report on the means to be adopted for the prevention of injury arising from the exhalations of acids and vapours. It will be remembered that a Select Committee of the House of Lords was appointed in 1862 to inquire into the injury resulting from noxious vapours, and into the state of the law thereon. This committee found that great injury was done to vegetation, trees, hedges, and agricultural produce by the vapours from alkali and copper works more especially. With respect to copper works no recommendations were made, but with regard to alkali works, in which common salt is treated with sulphuric acid for the manufacture of salt cake (sulphate of soda), emitting muriatic or hydrochloric acid gas, the committee thought it was quite easy to carry on the manufacture without causing perceptible injury. A bill was introduced in 1863, and passed into law, by which every alkali work was to secure the condensation of not less than 95 per cent. of the muriatic acid evolved under certain penalties. We need not say the effect of this legislation has been beneficial; it has been remunerative to the manufacturer, and many improvements are due to the pressure of the Act. Dr. Angus Smith since ascertained that the greater part of the injury to vegetation was not done by muriatic but by sulphuric acid, and the Alkali Act of 1874 embodied his suggestion, and brought sulphuric, sulphurous, nitric, sulphuretted, hydrogen, and chlorine gases under the definition "noxious gas." The Commission that has just finished its labours had to deal with the results of this Act; but from what we glean sufficient time has not elapsed to enable an opinion to be expressed, or as to whether the "best practicable means" were being adopted for preventing the discharge of noxious gases into the atmosphere. The inquiry commenced at Liverpool in 1876, and though of a similar kind to that of 1862, had a larger scope. The alkali works and other manufactures were included, and numerous witnesses were called. Evidence showed clearly the destructive effects on vegetation of alkali, copper, and other works at Widnes, Runcorn, St. Helen's, Liverpool, &c., and it was found that these injurious effects were widespread in the direction of the prevailing winds, more particularly in the east of Lancashire. Dr. B. W. Richardson, in his evidence, asserts that vapours may cause mischief to trees at a distance of 6½ miles. He admitted that very fine vegetation was to be seen within a mile of the works, and that the effects were felt on the rising ground, and not in the valleys, where trees in full foliage may be seen, while those of a similar kind on high ground were quite divested of leaves, and destroyed. Similar evidence is adduced by Mr. Shaw, landscape gardener, who describes the destruction to old and young trees of oak, ash, beech, birch, and coniferæ, at Halsnead Park, five miles distant, caused by the vapours from Widnes; by Sir R. Brooke, who declares the trees in his park are all destroyed, and have been cut down by thousands, and that the hedges are all injured, and by Mr. Wallace, of trees destroyed in the Tyne district. The crops have also suffered from the vapours, and the effect is described as if a fire had passed over them. Evidence was also given of a great depreciation of the value of farms in consequence, and injury to milch cows and sheep in the Tyne district. The copper works are asserted to have done the most damage. The effects upon health by the gases from alkali works have been attested by medical witnesses. Dr. McNicoll, of St. Helen's, is of opinion that the gas acts as a depressent, and others say that it aggravates all chest affections. Counter evidence of manufacturers rebut these imputed injuries. It is asserted that the alleged injuries to vegetation, &c., were due to the escape of gas before the Act of 1863; that the evils have diminished since the commencement of inspection, and that the letting value of land near Widnes has increased since the Act of 1874, and that sites near have been sold from £1,600 to £4,800 per acre. Numerous other witnesses speak of the increased value of farm land and produce, the former having considerably increased since 1861; but we pass on to notice the conclusions of the Commission. First, it is admitted that vegetation and property have suffered greatly, and that much of the damage has been due to sulphurous acid given out by the combustion of coal. The amount of injury inflicted is considered to depend upon the prevalence of certain winds, the configuration of the ground, and the heights of the chimneys—the higher the latter the farther the gases travel. It is thought that sulphuretted hydrogen, so sensible to smell, has given rise to much of the dissatisfaction, and is taken to involve all the ill consequences of more deadly gases. A gradual rather than immediate enforcement of the law and a larger number of inspectors are recommended, who should have power to inspect alkali waste heaps, and to call attention to defects in the plant and machinery of manufactories, such as cracked walls, leaky pipes, and furnace walls, insufficient water for condensation, &c. The Commission endorse the opinion that vapours evolved in copper-smelting are as injurious as those of alkali works, and much evidence is adduced in support of this view. The calcining of the ore and the smelting operations are recommended to be carried on in close furnaces, as in the Gerstenhöfer furnace, that used by Messrs. Vivian at Swansea. Next we have evidence respecting coke ovens, and the mischief caused by the heat, smoke, and sulphurous acid which is poured out of the old "beehive oven." Mr. Lowthian Bell says that half

the coke ovens in Durham economise their heat by carrying the heat under their boilers by a large culvert or flue between the ovens, placed back to back. Smoke and heated gases are discharged into this flue, the great heat consuming the unburnt particles of which smoke consists, while the sulphur gas is carried with the remains of smoke into a high chimney. The conclusions arrived at are (1) that all coke ovens should be placed under inspection; (2) that all coke ovens erected after the passing of the amendment of the Alkali Act should be required to adopt the best practicable means for preventing escapes of black smoke and for diluting sulphur compounds; and (3) that on complaint of nuisance, established to the satisfaction of the Local Government Board, existing ovens should be required to adopt the best practicable means for preventing the escape of black smoke, &c., a period of three years being allowed for compliance with the requirement. The black smoke and sulphurous acid emitted from the salt districts of Cheshire—as *e.g.* the Northwich salt works—are also referred to, and the injury to grass mentioned.

But the complaints of nuisance from works beyond the metropolis, on the Thames, are perhaps even of greater concern to us. Blackheath, Greenwich, and other parts are seriously affected by clusters of works, the combined odours from which permeate the houses and are most nauseating, and though it is said the smells are not injurious to health, they undoubtedly produce headache and depression, and depreciate the value of house property to a large extent. The report speaks of the inefficaciousness of the provision of the Public Health Act, 1875, which enables a sanitary authority to proceed against nuisances outside their district, as the officers have no power of *entering* the premises on which the nuisance arises. The Metropolitan Board are empowered by recent legislation to control offensive manufactures, and to make bye laws. Mineral, acid, and ammonia manufactures are declared offensive; but the report thinks chemical manure works require the appointment of superior officers to those of sanitary authorities, and that all such works should be required to adopt the best practicable means of preventing escapes of offensive vapours. The cement works near Northfleet and Greenhithe are complained of as a great nuisance, and Mr. Vulliamy's evidence as to the last-named place shows that the effluvia cause irritation of the breathing organs, nausea, &c. It is even asserted that the dense clouds of vapour from the Northfleet works impede the navigation of the Thames, and render it dangerous. Here is certainly a matter which the late sad catastrophe intensifies in importance, and the report speaks of a memorial from 130 London Trinity pilots and 50 steam-ship masters to the Thames Conservators, alleging various dangers and accidents in consequence. In the production of cement, chalk and Medway clay are combined in proportion of 72 per cent. and 28 per cent. respectively. Water is added, and the mixture called "slurry," after drying, is burnt with coke in kilns. The offensive vapours are chiefly empyreumatic, and result from incomplete combustion of organic matter in the clay. Professor Odling says improvement is to be looked for in more perfect combustion of the materials, and the introduction of the Hoffmann kiln. We find that cement works have been placed in the same category as dry copper works. But the chief complaints made to the Commission from nuisances within the metropolis are in respect of the potteries at Lambeth, and the sulphate of ammonia works at Battersea. Some very important evidence is given of interest to architects. The Archbishop of Canterbury says that the muriatic acid thrown off in the process of salt glazing is destructive to the stone of buildings, such as Lambeth Palace, and the trees of the locality, and that it corrodes plate and steel, and injures bookbindings. In contradiction to this statement, Mr. Doulton, of Lambeth potteries, cites Professor Odling to prove there is no injury done by salt glazing to either stone, vegetation, or health. Attempts to condense the acid have been made at Messrs. Doulton's works at St. Helen's, and Dr. Angus Smith is of opinion that the experiments will justify legislative compulsion to condense the acid. The Commission, however, have not recommended compulsory condensation at present, though inspection is advocated.

We can only mention further the sulphate of ammonia manufacture, which the Commissioners are of opinion should be placed under inspection. Gold refining, glass, and lead works are not dealt with. As regards the effect on health the Commission quotes Mr. Simon, who rightly argues that it is not necessary to show a nuisance to be injurious to health if it causes headache and depression. Again, some people get used to chemical vapours, others have sensitive bronchi, and are affected in health. The question of inspection is fully discussed, and the views of the Commission seem to be in favour of local inspection, the formation of groups of districts, and that local or sub-inspectors should reside at the centres of manufacture, and give their whole time to inspection. It is thought that exceptional legislation should not be resorted to until the failure of the existing general law is established by experience. In conclusion, we find in the suggested amendment of the Alkali Acts that the escape of one grain of sulphur in the form of any of its acids contained in one cubic foot of exit gases, or the escape of more than half a grain of nitrogen in any form of acid contained in one cubic foot of exit gases is to be considered an offence. Works for the manufacture of arsenic, cement, cobalt, dry copper, wet copper, galvanising, glass, lead, nickel, salt, glazing salt, spelter, tin-plate, and dye works are also to be placed under inspection, and the Local Government Board are empowered to fix a standard of escape.

MEDIÆVAL OPUS ALEXANDRINUM MOSAIC PAVEMENTS IN ENGLAND.

A CORRESPONDENT replying in "Intercommunication," on p. 174 of the present volume, referred to the lack of information respecting *Opus Alexandrinum*, and was obliged to content himself with a short extract from a South Kensington "Art Handbook." The following particulars may not, therefore, prove unwelcome.

Opus Alexandrinum—or, as it is sometimes also called, Opus Grecanicum—may be described generally as tesselated marble-work, laid in grooves cut in marble slabs, which form a solid foundation for the work and a border to the pattern. It is used both for pavements and for wall and church furniture decoration, but as the term Opus Grecanicum is also applied sometimes to the glass mosaic, which is not used for pavements, there is a tendency to restrict the term Opus Alexandrinum to pavements, and it is of them only we wish to treat in this article. The forms used in mediæval Opus Alexandrinum are mostly geometrical, and the variety of beautiful colours of the valuable stones forming the tesseræ, contrasted with the delicate bordering, usually produce a most harmonious effect. The tesseræ are mostly small pieces of porphyry, serpentine — reddish-purple and green-coloured—with palombino, a white stone not unlike clunch, but much harder, and Giallo Antico, a light yellow marble with an occasional blush tone. The materials for mediæval work of this nature were for the most part derived from the spoils of ancient buildings, and many must have been the column sawn into slices by the mosaicist, in proof of which one may be seen still standing with a slice half cut off outside the Chapel Royal at Palermo.* This kind of pavement is of very great antiquity, and is usually considered as closely resembling that which was introduced into Rome (according to Lampridius) by the Emperor Alexander Severus, A.D. 222-235. That historian says that "the Emperor brought with him from Alexandria great quantities of porphyry and serpentine, which he caused to be worked into small squares and triangles, variously combined." Hence the name Opus Alexandrinum. Pliny had, however (Book xxxvi., c. 25), long before described "a species of mosaic for pavements, composed of interlayings of porphyry and serpentine, richer in colour, and less likely to wear out than softer marbles." These he calls "Pavimenti Grecanici." But upon the removal of the Imperial capital to Constantinople in 329, the workers in mosaic seem to have migrated thither with the court from Italy, and for centuries the Greek workmen became the special and almost exclusive professors of the art. It was they who originated the Byzantine glass mosaic, which adorns many a Christian temple now covered over with Mohammedan whitewash, and covered the walls of churches and baptisteries, both in Italy and Sicily, with "the gilded ground and the gorgeously-draped and swarthy-visaged saints, peculiarly Byzantine." They also re-introduced the art into Italy, where Opus Alexandrinum formed the ordinary Italian church-paving from the time of Constantine down to the 13th century. The Italian artists, however, learned to excel their teachers, and have left us many exquisite specimens, the most worthy of notice being those in the choir of the church of St. Mark, in the churches of St. Maria Trastevere, St. Bartholomew, St. John Lateran, St. John and St. Paul, St. Maria Maggiore, and the truly magnificent specimen—perhaps the finest Italian work now existing—in the nave of the Basilica of San Lorenzo fuori le Mura. These are all in Rome, and all show more or less traces of Byzantine taste in their geometrical patterns. Our readers who may wish to study these fine Italian works will find them splendidly coloured in Sir M. Digby Wyatt's work "On Mediæval Mosaics." The last named, he says, is probably of the eighth century, when Pope Adrian I., the great patron of mosaic work, remodelled the ancient church of Pelagius II.; but Dean Stanley speaks of it as freshly laid down in the thirteenth century. There are very few specimens of this class of work in England. The finest is the mosaic pavement in front of the altar in Westminster Abbey. This was laid down by Richard de Ware, the first abbot, who received the confirmation of his election direct from the Pope himself, and thereby established the exemption of the abbey from episcopal jurisdiction—a privilege still maintained by the deans, his Protestant successors. To obtain that privilege he had been compelled to make a personal journey to Rome in the year 1267, and brought back with him both the materials and competent Italian artists to lay down this pavement, and also to execute the fine glass mosaic (perhaps the earliest of its kind in England) upon the shrine of Edmund the Confessor. In the central portion the pattern is evidently designed from that of San Lorenzo; the border, however, is far more elaborate, and when the pavement was fresh and all the materials highly polished, it must have presented an

* See a valuable paper by Mr. [illegible], in Sir Gilbert Scott's "Gleanings from Westminster Abbey."

appearance no way inferior to its Italian prototype. Its materials are porphyry, blue glass mosaic intermixed with the marbles—which all the old writers have mistaken for lapis lazuli—jasper, alabaster, Lydian and serpentine marbles, and touchstone, inlaid in Purbeck marble, which forms the bordering in place of the cippolino which alone was used in Italy. Unfortunately English Purbeck has not proved so enduring as cippolino, and hence the pavement now presents a somewhat dilapidated and dull appearance. In addition to the wear and tear of six centuries, it has also suffered from the wanton removal of thousands of its tesseræ, together with the brass inlaid letters which formed the inscription. One half also of the eastern border was entirely destroyed by the vandals of Queen Anne's days, when they put up a "classic altarpiece" originally designed by Inigo Jones for Whitehall chapel. The pavement then had a narrow escape from entire destruction, but its danger was perceived just in time by Harley, the first Earl of Oxford, and Dr. Sprat, the Bishop of Rochester, to whom we owe its preservation. The partially destroyed eastern border has, however, been faithfully reconstructed in imitation of the original work, and with equally valuable marbles, by Messrs. Henry Poole and Sons, the present master masons to the abbey. This restoration was effected at the time of fixing the new reredos in 1869. So exactly has the original workmanship been imitated, that it requires very close examination to detect the juncture of the old and new work. The following fully detailed description will convey an idea of the beauty, variety, and harmony of its colouring.

The centre of the pattern is a circular slab of clouded porphyry, 2ft. 6in. in dia., and around this have been small six-rayed stars (now dilapidated very much) of lapis lazuli, pea green, white and red; these were inclosed by a band of alabaster bordered with a circle of red and green lozenges, with half lozenges of the same colours, forming triangles. Two other bands diverge towards the cardinal points, and become the extreme borders of four small circles, all differently ornamented; that towards the east has a reddish-coloured circular centre, variegated with white; that to the south a dark coloured centre, within an octagon of variegated light brown; that to the west has a hexagon, and that to the north a heptagon for its centre, the colours being nearly similar to those just described. Stars, lozenges, wedges, squares, &c., of different colours are included in the various borders; and all the spaces between the circles and the large diagonal square that encloses them present a similar variety of forms; those, however, on the south side are more modern than the others, having undergone the process of repair.

The diagonal square is composed by a grey-coloured double border, inclosing an abundance of devices, formed by stars, squares, circles, triangles, and other figures. One of the angles contains upwards of 130 intersecting circles, each formed by four elliptical pieces, including a square, and the other angles are as various in design as they are in colour. From the middle of each side of the diagonal, the three lines which form it branch out into large circles surrounding smaller ones, the several centres of which are large hexagons, all differently enriched, both in respect of colouring and variety of figure; that to the north-west is divided by right lines into small lozenges of green, within which are many red stars and semi-stars; triangles ornament the intersections, around each of which is a hexagon formed by green-coloured triangles; that to the south-west includes seven red and green stars, forming by their disposition a variety of hexagons inclosing other stars; that to the south-east is composed of thirty light brown, green, and red-coloured stars, and twelve semi-stars, within hexagons and semi-hexagons of red; that to the north-east is divided into hexagons and triangles, the former inclosing twenty-four red and green stars, and six semi-stars, and the latter composed of twelve lesser triangles, red, green, and brown, with a lozenge centre. Each of the principal hexagons is surrounded by a circular border of diversified pattern and materials, and the intervening spaces between the outer circles and the great square (which incloses all the parts hitherto named) are occupied by stars and chequered work, variously coloured and disposed. The outer border is formed by four large parallelograms, whose boundary lines run into extensive circles, inclosing other circles, the centres and surrounding ornaments of which display a great variety of forms, colours, and devices. All the parallelograms likewise are very much diversified in design and colouring, and the serpentine wavings of every guilloche exhibit a similar richness.

A curious account of this pavement is given in a MS. in the Cottonian Collection, written about the year 1450, by a monk of Westminster (Cotton. Claud., A. viii.), from which it appears that in some occult fashion, which it is now impossible to understand, the design was intended to represent the duration of the world—a circumstance which was thus stated in a Latin inscription, formed of brass Saxon capital letters inlaid in the Purbeck marble bordering:—

"Si lector posita prudenter cuncta revolvat,
Hic finem primum mobilis inveniet.
Sepes trina canes et equos hominesque supra addas
Cervos et corvos, aquilas immania cete
Mundum quodque sequens, pereuntis triplicat annos
Sphericus aRchEtipum, *globus* hic *MoNsTrAt*
[macrocosum
Xri millenO. bis centeno duodEno
Cum sexageNO, subductis quatuor anno
Tertius Henricus, Rex Urbs, Odericus, et Abbas,
Hos compegere porphireos lapidEs."*

Of this inscription only eleven letters (here indicated by capitals) now remain, and the matrices of others (indicated by italics) can be more or less perfectly traced in the Purbeck stone, but all the rest have long ago perished. The following interpretation of it we translate also from the MS. as a curious example of what passed for scientific knowledge among the learned of the 15th century:—

"If the reader will dispose himself diligently to consider these things, he will discover the end of the primum mobile (*i. e.*, the universe). Thus the threefold hedge represents three years, for three years is the time a dry hedge is constructed to endure; a dog endures for three times that space—that is, for nine years; a horse endures thrice the lifetime of a dog—that is, twenty-seven years; a man endures thrice the lifetime of a horse—that is, eighty-and-one years; deer endure thrice the lifetime of men—that is, two hundred and forty-three years; ravens endure thrice the lifetime of deer—that is, seven hundred and twenty-nine years; eagles endure thrice the lifetime of ravens—that is, two thousand one hundred and eighty-seven years; the duration of a great whale is to thrice that of an eagle—that is, to six thousand five hundred and sixty-one years; the world endures thrice the lifetime of a great whale—that is, to nineteen thousand six hundred and eighty-three years."

That such science should be thought worthy of being expressed in front of the most sacred part of Westminster Abbey may well excite the wonder of this generation. Abbot Ware, to whom we owe the construction of the pavement, was buried beneath it, on the north side, and his stone coffin was seen there in the year 1866.

There are two other mediæval examples of Opus Alexandrinum in England, which we can only briefly notice, and it is remarkable that they each occupy corresponding positions in front of the shrines of old English saints in our two great cathedrals of Westminster and Canterbury. That of Westminster is behind the high altar, in front of the still existing shrine of Edward the Confessor, and that of Canterbury is also behind the high altar, in front of the demolished shrine of Thomas-à-Becket. That in Westminster is laid in Purbeck marble, probably in the time of Edward I. The pattern consists of large and small circles, with stars composed of small triangular pieces of various colours. The work can, however, hardly be called regular Opus Alexandrinum, like that described above, where the Purbeck marble is jointed to the centres of the circles it encloses. In this example a small pattern is cut in square slabs of Purbeck, which could easily be prepared in advance and would require little skill to lay down, and the disposition of the circles is more like a diaper than the other pattern. In all probability this pavement is the work of a native workman trying to imitate Abbot Ware's pavement, but doing it in his own way. This pavement is now in a very bad condition, and the dean and chapter have covered it with boards to ensure its preservation. A small portion—which is nearly perfect—is, however, left uncovered, which will enable our readers who can visit the abbey to inspect it for themselves. The Opus Alexandrinum pavement at Canterbury is of a geometrical pattern, enclosed in a square placed diamond-wise, like the central part of the great Westminster pattern, which it some what resembles. It is composed of materials which have been evidently brought from abroad, but have been put together by an English workman, who inserted thin lines of brass around some of the forms. Black marble is also used, as well as the Purbeck, as a matrix and bordering. It is surrounded by a border of circular stones, ornamented with fantastic devices, which are said to represent the signs of the zodiac. These three examples of Opus Alexandrinum work all belong to the same age, that of Henry III., which was a period, resembling the present, of great architectural revival; but the style seems never to have taken permanent root in this country, owing, perhaps, chiefly to the difficulty of procuring supplies of the various coloured precious marbles of Italy, but none the less to the evident want of skill of our native workmen, both in design and execution, shown in the great falling off of the last two examples from the splendid work executed at Westminster by Odericus, the artist-workman whom Abbot Ware brought with him from Italy. And herein those who run may read a valuable lesson to the workmen of our present day.

W. H. R.

* We copy this inscription direct from the MS. itself. Camden himself gave a somewhat inaccurate transcript of it, and every succeeding writer on the antiquities of the abbey has copied his errors, and a few have added others of their own.

A CHAPTER ON SOME KINDS OF TIMBER.

SELECTION is unnecessary here. A general review would be too discursive, nor is it strictly within the carpenter's part of the timber question. England, at an early time, was profusely covered by forests. They remained so close to London in the reign of Henry II. that wild animals found shelter in adjacent coverts. At the accession of Henry VII. a third of the country was woodland, and we have Evelyn's statement that "the whole kingdom was plentifully stocked with all sorts of timber, especially oaks, until the 27th Henry VIII." But the native varieties were few. Julius Cæsar wrote that "every kind found in Gaul was also present in Britain, except the beech and the silver fir." The Rev. C. A. Johns, in a treatise issued by the Society for Promoting Christian Knowledge, says plainly "that by far too much importance is attached to this passage. Cæsar penetrated

but a very little way into Britain, stayed there but a short time, and rarely ventured to any great distance from the camp—consequently he saw very little of the country." After comparing several classical authorities Mr. Johns continues: "The tree which we call beech was undoubtedly the fagus of the Romans, and the chesnut castanea. Nor will there be any difficulty in discovering the propriety of grafting the beech on the chesnut (noticed by Virgil), the oily though smaller nut of the former being considered by the ancients much more valuable than the farinaceous nut of the latter." This taste cannot be termed exclusively antique, for Captain Head relates that when an English company had been formed to supply Buenos Ayres with butter the projectors were discomfited at the eleventh hour by the infinite preference for oil! The beech is widely located. It takes the southern slopes of Swiss mountains, leaving the north to the silver fir. King Louis Philippe had a private estate in Normandy whose beeches surpassed all others in France. It is the national tree of Denmark—superlative at Elsinore. On the Scotch coast, opposite the kingdom of the Royal Dane, some fine avenues adorn the Earl of Haddington's seat at Prestonkirk, near Dunbar. In England the older writers regard it as an aboriginal, and Mathews calls it at once the Hercules and Adonis of our sylva. The beech does not mix freely with other species, but on suitable soils the woods are extensive and luxuriant. In Buckinghamshire, a county once far richer in timber than at present, there remains, on the chalky tracts southward of the Chilterns, some splendid vestiges. The county takes its name, in fact, from the ancient predominance of the tree. Few spots are better known than Burnham Beeches. Berkshire has its Purley Beeches. Knockholt Beeches are a landmark in Kent.

Fagus Sylvatica, common beech, is from 60ft. to 100ft. high, attains its maximum in 80 years, and endures a century and a half. Many instances of extreme age are recorded, and the degree of senile deformity sometimes presented is a convincing attestation; but in other cases, exaggeration is more than suspected. The weight per cubic foot varies from 65lb. green to 43lb. dry. Or as Mr. Lastell states: "The specific gravity of the seasoned wood varies from 700 to 720, and averages about 705." Should the critical reader look for a decimal point, he is respectfully referred to the printer of the work, but no doubt the dry wood swims about three-tenths out of water. The resistance to compression and to extension in the direction of the length, is equal to oak; but not so to a cross-strain. The colour is whitish brown, with faint septal markings, and the annual rings are somewhat darker on one edge than the other. No taste nor odour is perceptible. The hardness is considerable, the texture uniform; the wood may be cut into thin plates, bears a smooth surface, and is wrought with moderate labour. Beech is durable, if constantly wet, and answers well for piles so circumstanced; but is otherwise perishable, and therefore unfit for structural purposes, though fairly in demand for many others. It is suitable for coach-panels, chairs, furniture, machinery, implements, turnery, and carving. Until superseded by millboard, it was so generally employed for the covers of books as to constitute their etymon. Sword-scabbards were also among the applications. No wood, green or dry, saving perhaps the birch or hornbeam, is so much esteemed for fuel, but when converted into charcoal, others give a higher weight-for-weight result. The facility with which branches that come into accidental contact unite and grow together (a habit termed knotting) is a characteristic of the beech. An example in West Hey Wood, near Stamford, is figured in Loudon's "Arboretum."

The CASTANEA VISCA, the eatable, sweet, or Spanish *Chesnut* (for Selby adopts that alternative orthography), was included among the beeches by early botanists, though now made a separate genus. The tree is a native of Sardis, the capital of ancient Lydia. We call it *Spanish* because the best fruit is imported from Spain, and sweet, to distinguish it from the horse-chesnut, which is bitter. It is supposed to have been introduced here during the Roman occupation, and is referred to, as well as the beech, by Giraldus Cambrensis (Girald Barry) in the 12th century. It rises with a straight trunk, and attains a height of 60 or 80ft. in 50 or 60 years, but from that time the timber ceases to improve. It begins even earlier to deteriorate at the heart, though the tree may live for centuries with all the outward signs of fruitfulness and vigour. The *Castagno de cento cavalli* on Mount Etna (in the same latitude as Spain and Asia Minor) was, perhaps, the largest tree in the world. It had separated, however, into several trunks below the surface of the ground, when measuring 200ft. in circumference! The chesnut grows abundantly in Italy and the southern parts of France; but, in more northern situations, the fruit does not attain perfection, and the germinative power fails to equal that of hardier trees. On this account Daines Barrington decides it to be of foreign origin, and the fact is certainly against the extreme prevalence in old times to which pretensions have been set up. As a cultivated tree it is admittedly of long-standing. At Betchworth, Surrey—though the name sounds more cognate to the beech—is an avenue of chesnuts. At Croft Castle, Herefordshire, is another; and individual trees, both in England and Scotland, have acquired celebrity for size and age. The rapidity with which the sap assimilates with the heartwood and the general rate of growth, cause the timber to reach its highest quality and durability in forty years. The annual rings are naturally wide, and the severance of the pores leaves deep punctuations; but medullary rays or silver grain are quite imperceptible. These characteristics and the colour—that may be termed chocolate of varying intensity—constitute the features by which the material must be identified *in situ*. It is of little use to know that by cutting a thin slice off the end of a timber the presence or absence of the silver grain may be ascertained; or that the question may be settled by comparison of weights, when the inquiry concerns an ancient roof that cannot be disturbed. In order to exercise the judgment, it is desirable that a panel of oak and a panel of chesnut, the same size, should be prepared. Each should be enclosed in a frame to conceal the edges, and the weights rendered equal. When able to discriminate unerringly between such panels, the expert would be qualified for the examination of fixed material; whereas, of those who inspected the roof at Eltham, some reported it to be one wood and some another! But, if any single circumstance can be deemed remarkable and misleading, it is this. Tredgold (and every carpenter justly holds that name in honour), having compared the qualities of beech and chesnut by taking oak as a standard, with a fixed value of 100, states the result to be for—

	Beech.		Chesnut.
Strength	103	...	68
Stiffness	77	...	54
Toughness.....	138	...	85

Yet, in the face of a verdict so condemnatory, he allows the assertion to remain in his book, that "chesnut is useful for the same purposes as oak." He had, however, been early drawn into the schism, and at one time thought it might have endured the convulsive strains of Westminster Hall! The proper application of home-grown wood is chiefly for posts, hoops, and wine staves. The French use it for shingles, and the Italians their own superior wood for furniture. Many experimentalists have weighed chesnut, but with more than common diversity of result, and fixing nothing—save that a cubic foot rarely weighs less than 33lb., nor more than 54lb.! It burns well, and makes excellent charcoal.

The OAK, although vested with superior grandeur on the confines of the Adriatic, has undisputed sovereignty in our domestic groves, and few names are so intimately associated with old English localities. Oakham, the capital of Rutlandshire, Oakhampton, the disfranchised borough on the river Oke, in Devon, and many similar examples, connect the sylvan monarch with the earliest pages of history. Even where, as at some spots in Northumberland, it no longer rises, because of changed conditions, huge trunks are found in the alluvial earth, attesting ancient occupation of the soil, and a development rarely observed elsewhere. Spelt in various ways, the sound was doubtless *ake* in Saxon talk. An early writer—Turner—says, with the caution of a dietarian: "Oke, whose fruite we call an acorn, or an eykorne (that is, the corne or fruite of an eike), are harde of digestion, and norishe very much, but they make raw humores. Wherefore we forbid the use of them for meates." Discarded as an element of human sustentation, acorns have been consigned to the support of hogs; and woods were valued in "Domesday Book" according to the number of hogs they would fatten. The word quercus is by some derived from the Greek *choiros*, a pig; but others regard it as a Celtic compound of *quer*, beautiful, and *cuez*, tree. The family is so numerous that Loudon says: "The varieties of British oaks which might be selected from extensive woods of that tree are without end." These varieties seem to be gathered into two main classes—1. *Robur*, equivalent to strength; and, 2, *Sessiliflora*, implying the seated position of the flowers and fruit. Robur is called *peduncled*, from the long stalks on which the fruit is borne; also the *female*, and (from its bark) the *white* oak. Sessiliflora has several subnames. Loudon observes: "The name of chesnut oak is given to this species because the wood is supposed by some to resemble that of the sweet chesnut, as do the leaves in a slight degree of some of the varieties." The French names imply the male oak, the red oak, and the hard oak. The forest of Fontainebleau and the original stock of the Bois de Boulogne (transplanted from Versailles, but now very generally changed) may be referred to as examples. It grows more freely, lives in poorer soils, and does not rend so easily as Robur. The division, however, is modern, and, except for botanical objects, requires no particular attention. The two kinds have doubtless had joint possession of this country, in its length and breadth, from the remotest times, and the defects attributed to one or the other are more probably due to colonial or foreign substitutes than to fairly-treated English wood.

The timber attains greater perfection in size and quality on loamy than on other lands, and the slow produce of dry and open situations is better proof against decay than the softer and more rapidly-grown wood of moist and sheltered valleys. In the south of England a ground oak will acquire a diameter of 6in. in fifteen years, but the time necessary in the Scotch highlands would be a quarter of a century. A tree measured by Tredgold was 17in. diameter when sixty-five years old; but one at

Wimbush, Essex, showed an increase of an inch and a-half only in thirteen years. At Holt Forest, Hampshire, one was girt in 1759, when (at 7ft. from the ground) it had a circumference of 34ft.—a measure that twenty years later had not increased ½in. A correspondent of the Bath Society calculated that a circumference of 47ft. must indicate an age of 1,500 years. Upon such data it is only safe to say that an increased diameter of ¼in. per annum may be the average accretion during the first century; but from an early date the yearly layers become gradually thinner. The oak sometimes takes a comparatively tall form. "The duke's walking stick," at Welbeck, was 111ft. high, with 70ft. of clear trunk, but normally it is rather spreading than lofty. The Three-shire Oak, near Worksop, was so situated, and so broad, as to drip over an area of 777 square yards, in the three counties of York, Nottingham, and Derby. A neighbouring example measured 180ft. across from extremity to extremity of the opposite branches.

A detached tree in Langley Wood, by the New Forest, threw its arms 40ft. each way; and, although the stem was but 20ft. long, it was 6ft. in diameter at the top, and sound. The head was so full of knees and crooks, then highly valued in ship-building, that to preserve them from injury the tree was not felled in the usual way, but taken down piecemeal by careful dissection. It showed more than 300 rings, and contained 32 loads of hewn timber. The trunk of the Gelonos oak, near Newport, Monmouthshire (felled 1810), was only 10ft. long, but 9½ft. in diameter. In its midst was a stone 6in. thick, yet the enclosing wood bore no mark of decay. The stripping and felling occupied five men twenty days. It had gone on improving throughout its existence, though the rings, when carefully counted, exceeded 400. By sale and resale the price reached £675, and the bark alone, estimated at 6 tons, brought £200. The Squitch-bank Oak in Bagot Park, Staffordshire, was 43ft. round the base. It was 61ft. high, and contained 1,012 cubic feet. Under the shelter of Fairlop Oak, in Hainault Forest, Essex, in the last century, Daniel Day used to assemble his friends, on the first Friday in July, to dine on beans and bacon: so that bean-feasts have a pedigree. The tree was blown down in 1820, and part of it was used for the pulpit and reading-desk of St. Pancras Church. Those objects present not only fine specimens of the wood, but memorials of a sylvan patriarch, whose term of vegetation reached probably 1,000 years! *(To be continued.)*

NOTES FROM LEAMINGTON.

LEAMINGTON, though a large and rapidly-increasing town, seldom contributes anything to the chronicle of architectural events. Of buildings there is plenty; witness the acres of bestuccoed villas, but of architecture very little. Yet there are, in various stages of completion, one or two buildings, a description of which may interest some of your readers. First, from its scale and unusual features comes the parish church of New Milverton, a large and steadily extending suburb on the west or Warwick side of Leamington. This church, a perspective view of which was given in the Building News of Sept. 11th, 1874, is from the designs of Mr. Geo. Gilbert Scott, but the actual building differs from the sketch in many important respects. For instance, the double transepts favourably noticed have given way to the usual single arrangement, their roofs being zinc-covered, and of the low pitch generally found with Late Decorated architecture. The north transept is externally under one roof with the organ chamber, which opens into it and into the chancel by an arch corresponding in height and size with the side windows of the chancel. These windows, whose sills are many feet above the floor line, are of four lights, surmounted by well-designed tracery, and, with the buttress space, occupy the whole upper surface of the walls. In the sketch transoms are shown, but these are only found in the great east and west windows. The east window is very lofty, and presents the unusual arrangement of six lights below and five above the transom; the light of double width having been expressly designed to avoid the awkwardness caused by the attempt to cramp a "Crucifixion" or an "Ascension" into the centre light, or the still worse effect of mullions cutting through the arms of the body on the cross. In the sketch the roofs of chancel and nave form one continuous line, but in reality the chancel roof is externally some feet higher than that of the nave—a most uncommon feature—and a stone coping surmounted by a bell-gable marks the division of the parts. Both roofs are covered with pale red tiles; those of the aisles are almost flat, and are covered with zinc. The aisle windows, of three lights, have reticulated tracery, the pattern of those on the north differing from those opposite, and this is the case with the clerestory windows, which are also of three lights, but smaller than those below. The tower, which will rise to about 150ft. in height at the west end of the nave, will form a noble feature in the landscape; at present it is level with the springing of the nave roof, about 50ft. On entering the church, one is struck by the elegant, if somewhat bold, effect due to the entire absence of capitals, all the arch mouldings dying away into the jambs or being continued to the bases. The nave is of five bays, with a low and narrow archway for entrance at the western end of each side, the fifth bay eastward being formed by the lofty arch opening into the transept. The piers, which have no bases, are, with the aisle walls, to be panelled in oak up to about the height of 5ft. The chancel is of equal width with the nave, and has a beautiful roof, groined in wood, with some really good foliage carving in the bosses. The external ridge is about 73ft. from the floor. On either side the reredos space in the east wall are two small doors, such as may be seen in the altar screens of many Perpendicular churches; one is blank, the other leads by some steps to a passage skilfully contrived between the eastern buttresses, a capital cupboard for "Turk's heads," &c. The roofs of transepts and aisles are also groined; that of the nave is a boarded barrel vault with a deep cove above the wall plate and iron ties, and is certainly far from beautiful. All the roofs are painted in light colours, and this, with the plastered walls, Bath stone dressings, and clear glass windows, gives the interior a painfully blank look, which will no doubt be remedied ere long by the insertion of painted windows and decoration of the roofs. A spacious vestry opens into the transept, and is connected with a commodious parish room. The new vicarage, also designed by Mr. G. G. Scott, in the so-called Queen Anne style, stands in an extensive garden abutting on the north side of the church. The materials of both church and house are a small red brick, of good colour, with Bath stone for dressings, piers, &c. The architect's designs are being thoroughly carried out by Mr. Smith, builder, of Milvertown.

Another building just approaching completion is the campanile of the R. C. church. The church itself, a massive building with early French Gothic features, was built about 15 years ago from the designs of Mr. Clutton. The bell tower just erected, and about to be furnished with a peal of six bells is connected with the south aisle by a porch about 15ft. long. It is of five stages, and rises to a height of 150ft. The first stage, with its deeply moulded doorway, forms a vestibule; the second and third are quite plain, pierced by mere slits in the brickwork, one in each face; the fourth stage has a blank arcade of two arches corresponding with the two single-light windows in the belfry above. These windows have Mr. Ruskin's favourite bold shutters, three lead-covered slides to each. The tower is capped by a pyramidal roof, 36ft. high, covered with lead, and is finished with a lofty iron cross of simple design. The isolated position of the tower, and its slightly projecting buttresses, make it look a good deal higher than it really is, and give it the true campanile character. The materials are a local red brick and Bath stone.

There was lately opened in the new district of South Leamington the nave of St. John Baptist's Church, built from the designs of a local architect, Mr. John Cundall. The style is an adaptation of Early English to red brick and Bath stone. The nave is about sixty feet high and of six bays, the westernmost being slightly narrower than the rest. The piers, alternately round and octagonal, are of a hard blue-grey stone, with moulded caps—bases of Bath stone. The clerestory has three lancets to each bay, the middle light longer than the others, and it is from these and the four lofty lancets in the west front that light is chiefly obtained, the aisle windows being very narrow lancets unsplayed. The chancel arch, fifty feet high, is at present walled up, but it is hoped that ere long funds will be forthcoming to complete the chancel, with its semi-octagonal apse, and the tower and spire which will rise at the east end of the north aisle, and in the lowest stage of which the organ will be placed. The chief entrances are at the western ends of the aisles; the north porch abutting on the road being specially handsome, and having a figure of the patron saint in an elegant niche above the doorway. There is a peculiarity about these porches which might be oftener adopted with advantage—viz., the doors are not set in the aisle walls, which thus form a curtain arch within.

Leamington is now a corporate town, and, it is to be hoped, will not long rest content with the wretched quarters in which, under the dignified title of town hall, all magisterial business of the place has for so many years been transacted. As it is, with the exception of a bank, Leamington can boast not a single secular public building worth notice for its architecture. S.

THE SOCIETY OF ENGINEERS AT CROYDON.

ABOUT five-and-thirty members and associates of the Society of Engineers visited Croydon, on Wednesday, in order to inspect the Steam Clock Factory of Messrs. Gillett and Bland, and the Croydon waterworks, sewage-extracting machinery, and sewage farm.

At Messrs. Gillett and Bland's the whole of the operations incident to clock-making were seen in progress, and were explained by Mr. James Bland. The various contrivances for securing perfect accuracy of fitting—such as the concurrent planing of two surfaces to a true level, the drilling of holes at several angles at the same time, the automatic cutting of cog-wheel teeth in discs of brass by a steel point revolving 18,000 times a minute, the polishing and rendering true of the interstices between the cogs by an emery wheel, and many other processes of equal ingenuity were witnessed with much interest. Upon entering the works the three-leg gravity escapement pendulum, destined for the clock on the chief tower of Manchester New Town Hall, was seen in course of being finished, and in an adjoining room was hung the model of its immense faces. Upon the upper floors were seen, amongst many others, a great number of interchangeable works for post-office clocks, Messrs. Gillett and Bland having the contract for supplying the Department's offices throughout the United Kingdom. "Tell-tale clocks," in which the projecting points on a toothed wheel must be pushed down at the exact quarter of an hour, were also seen, and the mode in which they register the vigilance or somnolence of watchmen was practically illustrated. Another department in these works of growing importance is that of bell-founding and carillon construction. The metal used is an alloy of 4 of copper to 1 of tin—Mr. Bland, in reply to inquiries, stating that it had never been their good fortune when breaking up worn-out bells to find any trace of silver, traditionally said to have been thrown in in days of yore. Incidentally he corrected the statement that the firm recently cast a peal of 28 silver bells for the Duke of Westminster; as a fact the new bells for Eaton Hall were only of the best quality of bell-metal, and would cost £5,000, not £30,000. The metal when broken was mixed and melted in a reverberatory furnace—the fire not being allowed to touch the material. When molten it was run into sand moulds

beneath the floor, containing a core and a cover, both built up of loam and sand. Between these the metal ran as a kind of jacket, the head being separately moulded and added subsequently. After these explanations, delivered in the foundry in front of the great furnace, the visitors witnessed the casting of a bell of 10 cwt., to be hung in St. Luke's Church, Maidenhead, and of a smaller one—a colonial order. The plug being removed from the furnace, the vividly orange-coloured semi-fluid mass slowly crept like so much fiery treacle down a trough, and with some hissing and crackling disappeared in hollows in the sand which covered the floor, the scum being kept back by a man armed with a kind of hoe. Within a minute the three-quarters of a ton of molten metal had sunk into the moulds, and the visitors were glad to emerge into the yard outside, where were hung a number of large bells about to be sent off, including a series of half a dozen hemispherical bells intended for use in cemetery chapels and other buildings where there is not room to hang the ordinary forms; these have a tone relatively deeper than bells-proper of equal weight, but cannot be heard at so great a distance. In an upper room were seen carillon machines, in which the lifting and discharging apparatus are kept quite distinct, so that there is not the hesitation noticeable during the raising of the larger bells in the old chiming apparatus, and the machinery can easily be worked by hand from a piano-board below. We understand that the firm employs about 1,400 hands, including fitters. At the close of the visit, Mr. Bernhays, vice-president of the society, proposed a vote of thanks to Messrs. Gillett and Bland for permitting the visit, and for the interesting explanations afforded.

The members then proceeded, under the guidance of Mr. Balwin Latham, C.E., to the water-works in Surrey-street. The works are Gothic in style, built of white brickwork, and were built from Mr. Latham's designs in 1867; adjoining is an annexe of similar character, containing the engine; this was erected at a cost of £5,700, including fittings, from the plans of Mr. Walker, the present surveyor to the local board of health, and was opened a year since. The works are supplied from a well sunk to a total depth of 214ft., from which a volume of 2,800,000 gallons of water is withdrawn every 24 hours to supply a population of about 53,000 persons. Mr. Latham explained a series of tracings of the variations in the rainfall, pumping, sub-soil water level, and fever-rates in the town for many years past, and showed how intimately these are interconnected. In the works Mr. Davey, of Leeds, the inventor and patentee of the compound differential pumping-engine in use here, explained its characteristics—the principal one being the differential valve gear, which necessitates a uniform stroke, varying the quantity of water raised by increasing or diminishing the length of the pauses between each stroke. This was exemplified by experiment.

The members then adjourned to the Greyhound Hotel to dine together at Mr. Latham's invitation. The afternoon was spent with a visit to the sewage farm at Beddington, where the system of alternate irrigation of the various parts, and of cropping with rye grass and mangold-wurtzel, was explained.

The Town Council of Darlington have appointed Mr. Thomas Smith, of Sunderland, borough surveyor, in the place of Mr. Hudson Reah, resigned, at a salary of £350 per year.

An oratory was opened on Sunday at St. Marie's Roman Catholic Church, Norfolk-row, Sheffield. It forms an upper chapel, octangular in form, and is 10ft. above the chapel floor-level in the eastern aisle of the south transept. Two of the windows are filled with stained glass, by Messrs. Hardman, of Birmingham, and the floor is laid with Minton's tiles. Beneath a brattieed iron canopy is a white marble statue, sculptured in Rome, of Our Lady of Mercy. The new oratory is like the church, Late Decorated in style, and is externally marked by a spire of lead, surmounted by a gilded figure of the Archangel Gabriel bearing the lily. Messrs. Hadfield and Son are the architects; the builder was Mr. John Pearson, of Hanover-street; Mr. Earp, of London, has executed the stone and wood carving; and Mr. Boulton, of Cheltenham, the marble work of the altar.

THE BUILDING TRADE AND BRISTOL OPERATIVE CONFERENCE.

THIS week the eleventh annual conference of the trades-unions of the country was commenced in Bristol. The proceedings were attended by about 140 delegates, representing 623,925 members belonging to 21 trades' councils and 95 affiliated trade societies. The congress began on Monday.

Mr. Bailey, the chairman of the Parliamentary committee, presided during the earlier part of the proceedings till the chairman for the week should be elected. He gave an opening address, in which he referred to the advantage of trades-unionism; and then went on to remark that, though a large portion of the press was against them, and they had sustained serious defeats in Manchester, Northumberland, London, and other places, still they were not utterly crushed or demoralised. Mr. G. F. Jones was then elected president for the week, and, after some time had been spent in an irregular discussion respecting one or two members' credentials, Mr. H. Broadhurst read the report of the Parliamentary committee, which at the outset congratulated the congress on the progress that had been made during the last year with the "Employers' Liability for Injuries Bill." Though no actual legislative action had been obtained yet public attention had been called to the matter, and public opinion had undergone a remarkable change in reference to it. Speaking of the "Factory and Workshop Act," which would come into force at the beginning of next year, the committee felt confident that great advantages to the people would result from its operations. Several other bills before Parliament were also commented on, and the report in concluding spoke of the general depression of trade, not only in this country, but amongst other nations, and then went on to say:—

The present year has witnessed the close of two remarkable disputes in the building trade—the masons of London and the joiners of Manchester. In both cases the men were supported by powerful unions, with large accumulated funds and great resources in the power of levying for extra support. We regret to say that in both cases the men failed to establish their demands. This may be accounted for in many ways.

Although the building trades in Manchester and London were in a prosperous state at the commencement of the dispute, yet, under the power of the strike clauses now inserted in all contracts, the employers are enabled to postpone the completion of the works till an indefinite period.

On Tuesday morning the first business of any consequence was the President's address, a very lengthy one, chiefly devoted to a review of trades-unionism. Touching on the dispute that had ended so unsuccessfully to the building operatives in London and Manchester, he said though the result was to be regretted, yet in all fairness and honour no attempt should be made to fetter the employers or deprive them of the freedom workmen claimed for themselves, even though they (the masters) had recourse to the unpatriotic line of action of importing foreigners to work for them. The result of the strike he attributed to the London market being flooded with labour from Liverpool and Scotland. A somewhat warm discussion took place on this opinion of the president, and while some members held a different view, others agreed as to the cause of the operative failure. One or two north-countrymen said their workmen had been similarly hindered by Englishmen from the south coming to a district in which a dispute was pending. The President concluded his address by saying that notwithstanding all that had been said and written derogatory to trades-unions, it was gratifying to find there were indications of a revival in it. The remainder of the day was spent in discussing reports of an uninteresting character.

An old brass, long missing from the Chapel Royal, Savoy, has been recovered. It bears the inscription—"Hic jacet Gavan Dalkglas, natione Scotus, Dunkellensis Præsul, patria sua exul. Anno Xti, 1522." (Here lies Gavan Dalkglas (Douglas), by birth a Scot, Bishop of Dunkeld, an exile from his native land.) To preserve it from further dishonour the Rev. H. White, the chaplain of the Savoy, has had it embedded in a large block of black marble on the floor of the chancel over the place where the bishop was interred.

COMPETITIONS.

SHEFFIELD FEVER HOSPITAL.—A committee of the Sheffield Town Council have at the request of the council conferred with Mr. Swann, the architect selected by competition for the erection of the new fever hospital, with respect to the large variance between the amount of the tenders received and the condition in the competition for plans that the cost should not exceed £110 per bed, or a total of £7,040. The explanation is that the enhanced cost is owing to alterations made in the plans by Captain Galton, one of the most important of which is that the building should be a foot wider than was first intended. The cost was thus increased by £1,150, but Mr. Swann suggested modifications and omissions which would reduce the amount by £627, and also stated that in view of the increased expenditure he was willing to accept a commission on the whole of the works at a rate of £4 10s. per cent., in lieu of the customary £5.

LEEK FEVER HOSPITAL.—The improvement commissioners of Leek have had yet another discussion concerning the plans submitted in competition for the fever hospital. Four selected plans were sent to the Local Government Board, and that body advised that the plan marked "Esperance" was the best adapted for the purposes of an hospital, and that the one marked "Cave Pestem" was the next in merit (thus setting aside the board's choice of "Epidemiology" for first premium). Letters were also read from competing architects, complaining in strong terms that the whole of the 17 plans received had not been submitted to the Local Government Board. No one was willing to move a resolution adopting the recommendation of the central authority with regard to the allotment of premiums, but eventually Mr. Morton broke the silence by moving that the plan marked "Epidemiology" be adopted; this was seconded, but as it was suggested that the Local Government Board was unlikely after what had occurred to give its sanction to such a selection, the matter was adjourned for a fortnight.

TRURO.—In response to the advertisement issued by the Truro Town Council for plans for a corn exchange to be erected over the river at the back of the fish market, three designs with plans were sent in, and these were exhibited in the Council Chamber last week, one having the signature "Cornwall" being recommended by the committee as the best of the three. The only doubt was whether the design could be carried out for the stipulated price—viz., £1,600. The architect stated that he had consulted a highly respectable builder, who considered that the design could be carried out for the sum mentioned, but there was no undertaking to that effect. The design coming next in favour was one marked, "Let Truro Flourish," but no private letter accompanied it, and the name of the architect was unknown. The price for carrying out one design—viz., £2,100—put it at once out of the competition, whatever may have been its merits. This was a design by Mr. F. Ashwell, formerly in the employ of Mr. Henderson, C.E. The plan with the signature "Cornwall" turned out to be that of Mr. Sylvanus Treveil, with whom the town clerk has been instructed to communicate, to ascertain definitely whether the design can be carried out for the sum named. In the mean time the plans are open for public inspection.

The new Congregational chapel in Sneyd Park, Bristol, known as Christ Church, was opened yesterday (Thursday). The building is 13th-century Gothic in style, cruciform in plan, and is built of local sandstone, with Bath stone for tracery and moulded work. It seats 300 persons. Mr. Stuart Colman is the architect; Messrs. Cowlin and Son took the building contract; the sub-contract for carpentry being sub-let to Messrs. Harding and Vowles. We published illustrations of exterior and interior, and the plan, on January 12, 1877.

Rochester Grammar School, situate near the precincts, is now undergoing extensive alterations and additions in order to provide further accommodation. A wing is being added to the present building, and class-rooms are to be built. The whole of the work is being executed by Mr. J. G. Naylar, builder, of Rochester, from the plans of Mr. Blomfield, M.A., the architect to the dean and chapter.

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ILLUSTRATIONS.

THE TEMPLE OF JERUSALEM—ST. MICHAEL'S CHURCH, NORTHAMPTON—HOUSE AT CHISLEHURST—DESIGN FOR CLOISTER—OFFICES, GREY FRIARS, LEICESTER.

OUR LITHOGRAPHIC ILLUSTRATIONS.

THE TEMPLE OF JERUSALEM.

WE publish to-day a restoration of the Temple of Jerusalem as rebuilt by Herod, from a drawing by Mr. Fergusson, sent by him to the recent exhibition of the Royal Academy. A greatly reduced copy of the same drawing formed the frontispiece of his work on the "Temples of the Jews," to which the reader is referred, as there the data on which the restoration is based are set forth in detail, accompanied by sections and elevations to scale, with the illustrations and quotations necessary to render its various parts intelligible. The great difficulty of a restoration of this celebrated Temple is that the Jews aimed at producing a building which should be 100 cubits (150ft.) in length, 100 cubits in breadth, and 100 in height, without being a cube, and as there is every reason to believe that they accomplished this, no restoration can be accepted that does not take these dimensions into account. But more than this, both the "Book of Chronicles" and Josephus distinctly assert that some part, at least, of the Temple attained the unusual height, in those days, of 120 cubits, and this is stated with so much circumstantial detail by the latter authority, that it can hardly be overlooked. A façade, the height of which is equal to its width, or a little in excess of it, may be of very pleasing proportions, but when added to a building the whole length of which, including the façade, was only 100 cubits, it produces a disproportion which it seems almost impossible could ever have been pleasing as an architectural design. In like manner all the architectural details used in this restoration are copied from examples which are contemporary with Herod's Temple, or at least nearly so. The two pinnacles of the façade, for instance, are adapted from the monoliths now known as the tombs of Absalom and Zacharias, exactly opposite the Temple in the valley of Jehoshaphat, and certainly of about the same age as the Temple. The pillars of the façade are copied from those of a small copy of the Jewish Temple, at Siah, in the Houran, which was undoubtedly of the same age. The vaults under the Aksah, which were part of the substructure of the Temple, and Herod's own burying place, now known as the Tombs of the Kings, and other sepulchres around Jerusalem, have all afforded hints for the details employed. In fact, as Mr. Fergusson points out in the work above referred to, we now know with tolerable accuracy what the style of architecture was which was practised in Syria between the age of Pompey and the destruction of the city by Titus, and the details of that style are the only ones that are, or can be, employed in any attempt to restore the Temple of Herod. They certainly are not such as modern taste can approve of, nor such as previous attempts at restoration would lead us to expect, but they are the only ones that can be adopted in any design which purports to represent the Temple as it was in its days of greatest magnificence.

ST. MICHAEL'S CHURCH, NORTHAMPTON.

THE design for St. Michael's Church, Northampton, of which we give a plan and external view, was one of those submitted by Messrs. Burden and Baker, of 14, York Chambers, Adelphi, in a recent limited competition; the other was illustrated in our impression of May 31st last.

OFFICES, GREY FRIARS, LEICESTER.

THE illustration is taken from the drawing in this year's Royal Academy Exhibition. The front wall to ground-floor story is faced with Kitton stone, the upper stories are faced with thin red Surry bricks, and the gable walls are covered with rough plastering. The window frames throughout are of red deal with oak mouldings, the upper windows being built out as bays to obtain a side light at the end of the desks. The roof is covered with strawberry-coloured tiles from the works of Mr. G. W. Lewis, of Broseley. Mr. Isaac Barradaile, of Leicester, is the architect.

DESIGN FOR CLOISTER, R.I.B.A. MEDAL DRAWING.

AMONG our illustrations to-day we reproduce a selection of details illustrating the design for a cloister by Mr. J. Martin Brooks, for which he obtained a silver medal of merit in the recent competition for the Grissell medal at the Royal Institute of British Architects. Two competitors only submitted designs, and these were of almost equal merit, so that the council determined to award a second medal, and this was given to Mr. Brooks. The conditions were for a thirteenth century groined cloister, with a canted corner to accommodate a doorway, supposed to lead to other portions of the monastic buildings. The walls were to be of stone, and the details of construction were to be fully shown.

KEMNAL WOOD, CHISLEHURST.

THIS house is a new residence recently erected for A. Jackson, Esq., at Chislehurst. The accompanying illustration is taken from the S.E. point of the building. The plan of ground-floor explains itself, having the usual accommodation for a country house. The main feature of this is a large hall or billiard-room, with a panelled dado, 7ft. high, and from which lead the reception and principal rooms. Beside the entrance porch is a small private oratory for the use of the family, with panelled dado and open-ribbed roof. The chamber floor contains twelve bed and dressing rooms, bath-room, linen store, &c. Adjoining at right angles, and forming as it were a forecourt, are the stables, coach-house, grooms' rooms, fuel stores, &c. The building is executed with red brick facings, Box-ground stone, the portion above the first floor being weather tiled, and the roof covered with Broseley tiles. Mr. Blake, of Gravesend, has carried out the works under the direction and supervision of the architect, Mr. G. Somers Clarke, Mr. Bevan being the clerk of works.

A MEDIÆVAL ARCHITECT'S COMMISSION.

FOR BUILDING HELMINGHAM TOWER 18 FEB. 3 HEN. 7.

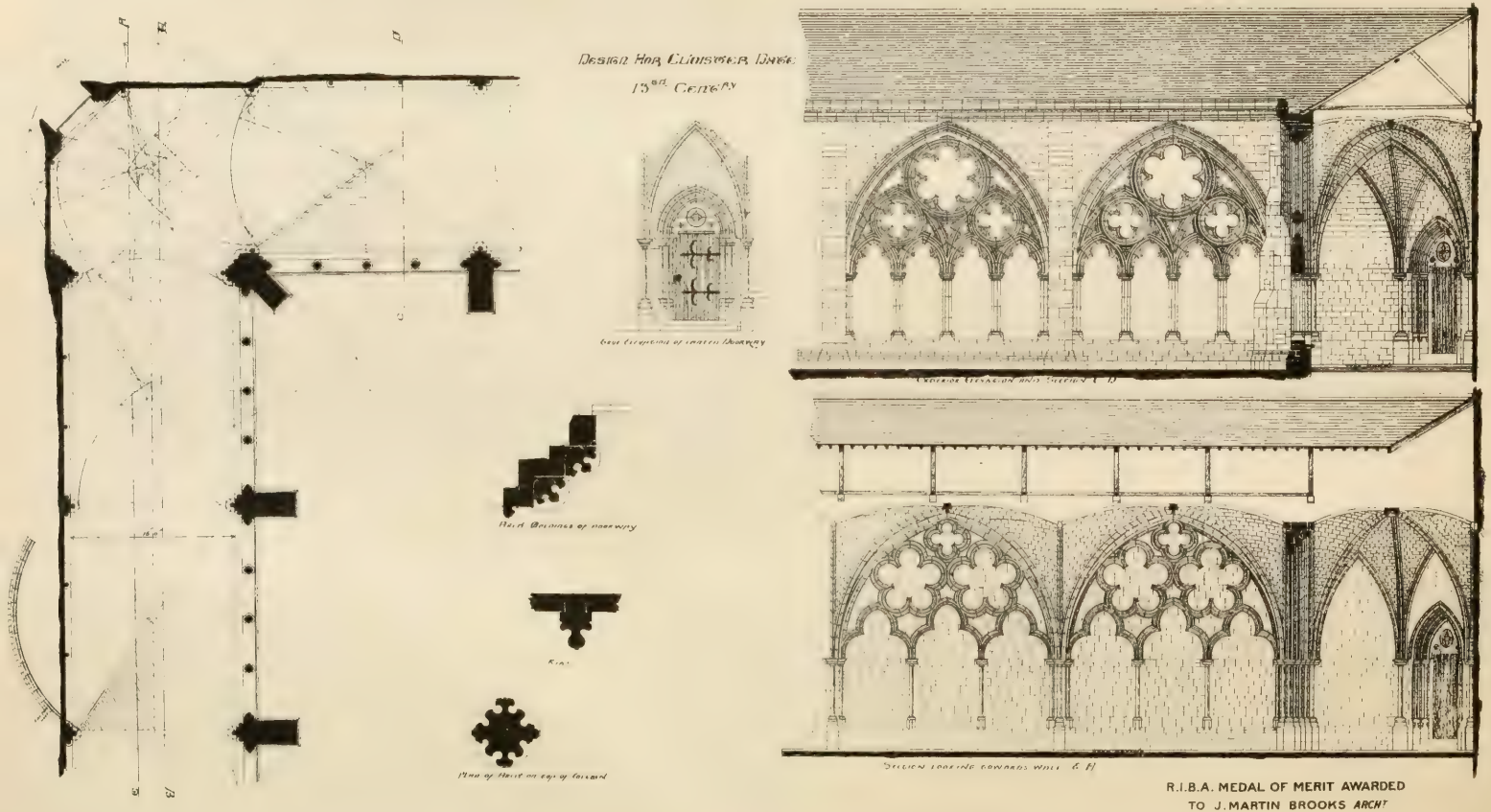
"THOMAS ALDRYCH shall with Godd's grace shall make at the westende of the Cherche of Helmyngham a sufficient newe stepyll of Ixfole of heyghthe after the brede wydnesse and thicknesse of the stepyll of Framesden with a black wall wroughte of Flynt and as many tables as the stepyll of Framesden halfth so that yt be made after the Facion of the stepyll of Branston the west dore the lowere west wyndowes and with a plae on eche side of the said wyndow for to sette in an ymage and with all the other wyndows and boteracies of the said stepyll so that the verge of the stepyll of Helmington be mayd in the north syde provydyng allwey that the sd stepyll shall be fynyshyd and endyth wythynd the tenner of x years next comyng and there shall be payd to him for every pole of the recole workyng of heyghthe of the same stepyll xs. of lawfull money to be payd at every jorney as he workyth aftyr the fote."—Tanner MS., 138-87.

MACKENZIE E. C. WALCOTT.

ARCHÆOLOGICAL.

REMARKABLE SEPULCHRAL SLAB AT CARLATTON.—At the last meeting of the Cumberland and Westmoreland Archæological Society, Mr. R. S. Ferguson contributed an account of sepulchral slabs in a farm-house at Carlatton. Carlatton is marked on the ordnance map as an extra-parochial place; it, however, had formerly a church whose site is well known, and though no remains appear above ground, yet the soil is so full of stones as to compel the tenant to desist from any attempts to plough it. The farm belongs to Lord Carlisle, and Mr. Routledge is the tenant. The farm-house is covered with rough-cast, a portion of which decaying off disclosed the slab, which is built into the wall in the back garden, the lower edge being on the level of the ground. Its dimensions are 6ft. 2in. by 2ft. 3in. at the top, and 2ft. 2in. at the bottom. A cross is carved upon it, on the dexter side of which are a chalice and book, and on the sinister a sword and sword-belt. A much obliterated inscription runs round the slab, apparently—"HIC JACET HENRICUS DE NEWTON QUI FUIT VICARIUS DE CARLATON. ORATE PRO ANIMA EJUS." Henry Newton was presented to Carlatton by the prior and convent of Lanercost, 1320. The cross, sword, and sword-belt are so exactly similar to the cross, sword, and sword-belt on a sepulchral slab at Great Salkeld (figured in Tyson's "Cumberland"), as to induce one to believe they came from the same chisel—a conjecture which receives additional probability from both places being in the valley of the Eden and easily accessible from one another. The unusual combination of the chalice, the book, and the sword with belt attached (which last is in itself unusual) make this slab, so far as Mr. Ferguson knows, unique in England. The chalice and book do not often occur together, and where they do the examples are generally in the county of Durham, with one at Great Salkeld. The chalice is the well-known symbol of an ecclesiastic, the book is often considered to mean a deacon, though Dr. Charlton, often finding it in connection with other emblems not of an ecclesiastical character, seems to have doubted this. On a slab at Newbiggen, Northumberland, the book occurs in connection with the sword, and Boutell's suggestion is that the stone was intended to commemorate two persons. There is a stone at Bala Sala, Isle of Man, to an abbot of that place, which has a sword and a cross; Grove considers this to denote that the abbot had temporal authority. Mr. Ferguson, however, has found no instance of the chalice and sword being combined. Two theories may be formed concerning this remarkable slab: (1) that it commemorates two persons, an ecclesiastic and a warrior, perhaps brothers—the unusual breadth of the slab lends itself to this theory; (2) that it commemorates an ecclesiastical personage, who exercised some military or civil authority, though it is difficult to see how such a slab has been entirely chiselled away by masons. Another slab, with chalice and book and cross, forms the lintel of a door in the farm-yard.

ROCHESTER.—The demolition of the Bridge Chamber at Rochester-bridge, which is now being carried out preparatory to the erection, by the bridge wardens, near the same site, of a commodious new Bridge Chamber, has led to the opening up of the remains of the ancient chapel of All Souls, the existence of which was well known to antiquarians, although what remained of the ancient edifice was entirely hidden by the surrounding buildings—a portion of the chapel being, until very recently, used as a dwelling-house. The whole of the walls of the chapel, up to what was once the roof, are now visible, together with portions of the oak beams, and the piscina is still to be seen. The main entrance, through the portico which still stands, is in a very perfect state, while the stone mouldings of the doors and windows, and portions of the pointed arches may still be traced. The chapel of All Souls was founded by Sir John de Cobham, who, with Sir Robert Knolles, was the founder of the ancient bridge over the Medway at Rochester, taken down about 22 years ago. The chapel was finished immediately after the bridge in 1397. An effort will be made to restore the ancient chapel.

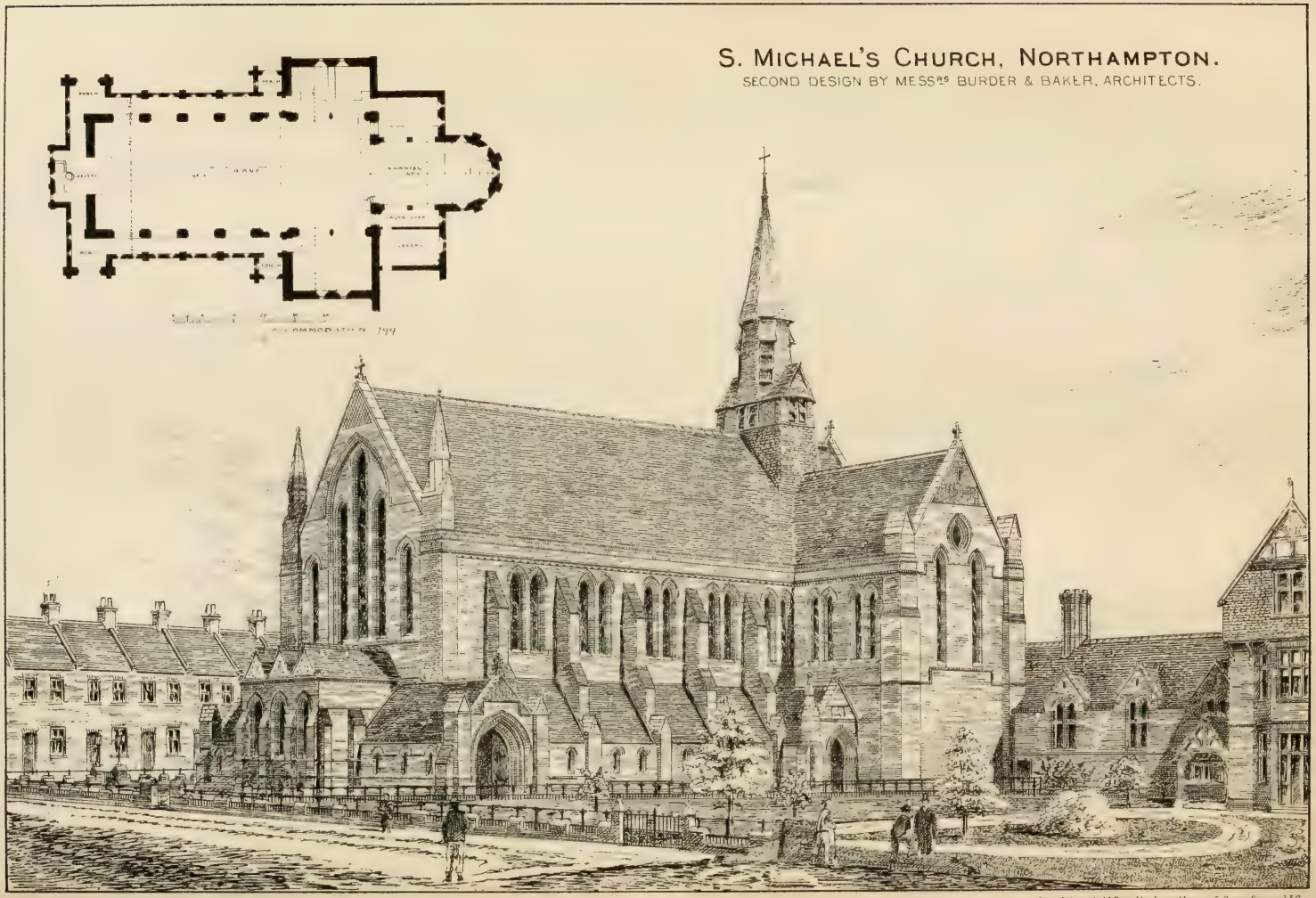


R.I.B.A. MEDAL OF MERIT AWARDED
TO J. MARTIN BROOKS ARCHT

Photo Lithographed & Printed by James Akerman, 6, Queen Square, W.C.

S. MICHAEL'S CHURCH, NORTHAMPTON.

SECOND DESIGN BY MESSRS BURDER & BAKER, ARCHITECTS.



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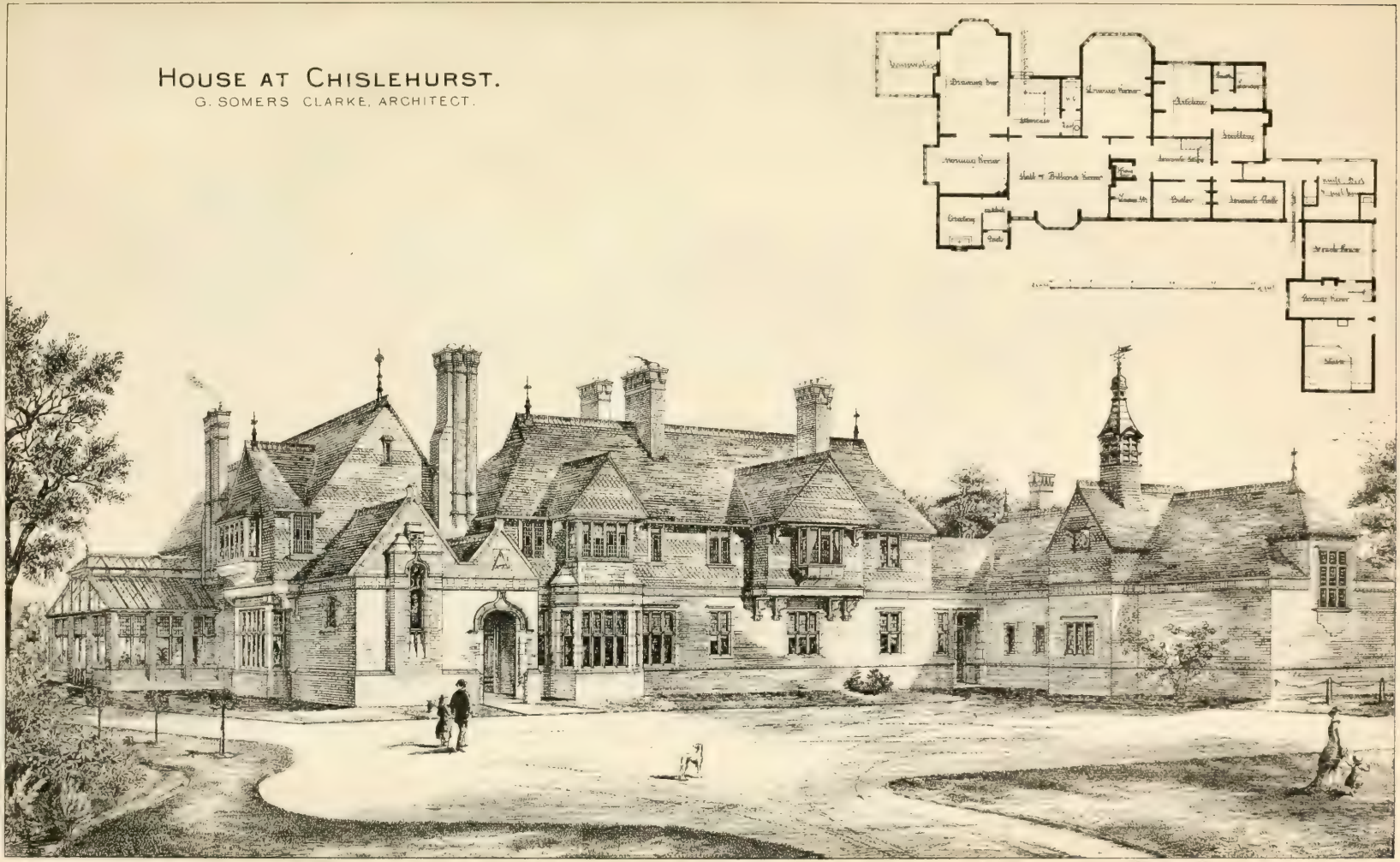
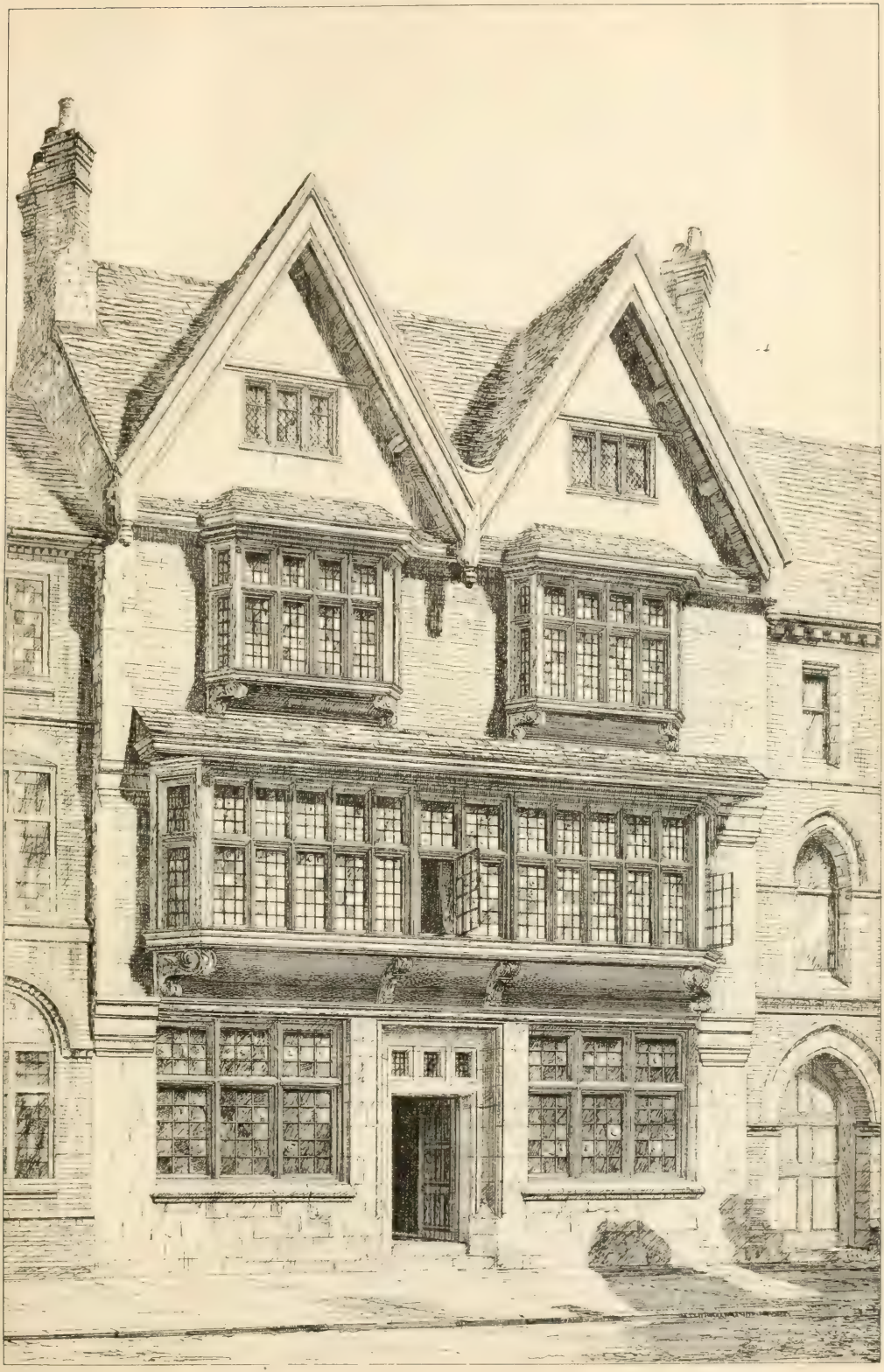
HOUSE AT CHISLEHURST.

G. SOMERS CLARKE, ARCHITECT.





OFFICES, GREY FRIARS, LEICESTER. ISAAC BARRADALE ARCHITECT

CLEOPATRA'S NEEDLE.

THE obelisk was safely swung and erected yesterday afternoon. During the past three months the work of constructing the pedestal and flanking masses of granite has proceeded concurrently with the raising of the obelisk in a horizontal position by means of screw-jacks. These works were completed on Saturday last. The operations commenced two minutes before 3 p.m. yesterday—the broad end being released, the huge mass revolved on its axis, from the trunnion in the centre of the girder which forms a jacket, with scarcely perceptible and very regular motion. The descent was regulated by men holding half a dozen ropes attached near the apex of the stone. Half an hour later the base was within a few inches of the pedestal, verifying the correctness of the engineer's calculations. The wrought-iron strap passing from either side of the jacket beneath the foot of the obelisk had not been removed, and for its passage a groove was left in the upper course of the pedestal. At this stage, when the strap impinged upon the pedestal, the movement of the monolith seemed arrested, but wedges and woodwork having been knocked aside the obelisk gradually righted, and at five minutes past 4 the running up of a Union Jack to the apex, followed by loud cheering and the blowing of steamboat whistles, indicated the successful issue of the undertaking.

CONWAY.

THE Church of St. Mary and All Saints, Conway, was formerly attached to a Cistercian abbey, built by Llewellyn in 1185. In 1283 King Edward I. translated the community to Maenan, three miles distant. There are Early English windows remaining; one, a triplet, is in the west tower, and some of Decorated date with good tracery. The foliage on the capitals of the west doorway is stiff but well cut. The church, 116ft. by 58ft., consists of a broad nave of four bays, with aisles, and an arcade on tall stilted bases, a south wing, and aisleless chancel, marked by the absence of the usual Welsh peculiarity of no windows on the north side, upon which the sacristy abuts. At each door is a holy water stoup. In the south aisle are two plain arches, forming sepulchral recesses, one with a cross on the coffin lid and the other having a 17th-century effigy of a lady, neither being *in situ*, and an ablution drain marking the site of an altar at the east end. The south wing contains a similar appurtenance. The rood loft is very fine, of Perpendicular date, and once communicated with a door on the south side, to which access must have been gained (as at Sopley, Hants) by a wooden ladder. There is an outer door, now walled up. The outer range of supports has been removed and a fragment only is preserved in the chancel. On the inner side was a similar screen. The central compartment is filled with open tracery, and at the cornice are a double row, the Prince of Wales' plume, and a fish in the claws of a bird, a lamb amongst foliage and trellice work. The old stall ends remain, with several fragments of poppyheads of benches. One bears the initials, and another in a contracted form the name of William Moland; others have two griffins combatant, a centaur, an eagle [for Wynne?], and the host in a monstrance. On the south side are a window lighting the loft, a lower window beneath it, and a shouldered arch over a doorway, now blocked up. The font, of the 15th century, has open niches round a central pillar, and stands nobly, being raised on tall steps. The famous Plas Mawr, with its fine courtyard and double turrets, is, I hear, doomed to sale. The only other ancient house remaining has an upper story corbelled out at the corner of the principal streets, and a rudimentary shouldered arch. In the street leading to the castle is a curious window carried upon double brackets, with curious rosettes, carvings, the arms of man, the Stanley crest, a bird's jaws, a lamb, a monster, and a lion, interspersed with some rich flowing tracery. My object in writing this note is to draw the attention of the authorities of the South Kensington Museum in the hope that they may take a cast of it before it is too late. Conway is not remote from the influences of "Restoration."

MACKENZIE E. C. WALCOTT.

Building Intelligence.

DOUNE, N.B.—St. Modoc's Episcopal Church was consecrated on Sunday by the Bishop of St. Andrews. The plans, as originally prepared by Mr. James Brooks, of London, the architect, show a chancel, nave, north transept, north aisle, vestry, tower, and spire, the lower portion of which serves as porch. These have all been erected save the north aisle and tower. The style chosen is that of the early part of the 13th century. The church is built externally of Polmaise freestone, with "random rubble," droved with rustic face, and internally with Dairsie freestone with rustic face. The chancel is groined throughout. The nave has a waggon roof, boarded on the under side with red and white pine, and divided into compartments so as to admit at some future time of painted subjects. An organ is fitted up in the north transept. The east gable has a three-light window filled in with painted glass. The church measures about 75ft. by 18ft. The contractors are, for mason work, Mr. Jones; and for joiner work, Mr. M'Niven, Doune. A general view of the church appeared in the BUILDING NEWS for June 30, 1876, and the interior of the chancel was illustrated on Oct. 5, 1877.

GREAT USWORTH.—The new schools erected at Great Usworth, in the county of Durham, by the Great and Little Usworth School Board, were opened on September 5th. The buildings, which are designed in a domestic type of Gothic, and built of stone, comprise mixed and infant school-rooms, with class-rooms, hat and cloak-rooms, and lavatories, together with a detached residence for the master and a large room for the meetings of the school board. The site is 1½ acres in extent, and affords ample playgrounds, play-sheds, &c., for the children, and garden ground for the master. Although nominally for 350 children the accommodation, calculated on the 8ft. basis, is sufficient for 475. A well has been sunk on the site, and an abundant supply of excellent water obtained, which, by means of a force-pump, is distributed to the several parts of the establishment where required. The architects were Messrs. Sept. Oswald and Son, of Newcastle-on-Tyne, and Mr. G. E. Forster, of Washington, was the contractor. The seats and desks have been supplied by the North of England School Furnishing Company, Darlington.

HINCKLEY.—New board schools, in the Spring-gardens, Hinckley, were opened on the 2nd inst. They are in plan triangular, with class-rooms abutting on to the yard sides, and in mixed and infant schools departments are calculated to accommodate 545 scholars. The buildings will cost between £6,000 and £7,000. There are large enclosed playgrounds, laid with asphalte and Derbyshire spar. The fronts are of pressed red bricks, made in the neighbourhood. The roofs are broken up by gables and chimneys, and covered with strawberry-coloured tiles. There are open timbered roofs, and curved and framed principals. A bell turret is placed over the centre of the mixed school. There is also a master's house adjoining, the materials and designs being in keeping with the schools. Messrs. R. J. and J. Goodacre, Leicester, are the architects, Mr. R. Friend clerk of works, and Messrs. T. and G. Harrold, Hinckley, contractors.

LLANGUNNOCH.—The restoration of the parish church of Llangunnoch, between Carmarthen and Llanstephan, has been completed. For years past the church was in a most neglected condition; it looked like a barn, with a lime and earth floor, bare rafters and tiles, with arches and pillars irregularly formed, and with pews only on one side. A new porch has been added to the south entrance, and freestone copings and crossings have been placed on the gables. The walls have been pointed, one or two windows have been put in, and a belfry erected. Inside, the arches have been made symmetrical, the roof boarded, the walls plastered and finished with stucco, the floors of nave and aisles laid with pressed tiles, while the chancel and Coomb chapel are paved with mosaic. The wood work is of pitch-pine, slightly stained. The pulpit, reading-desk, and harmonium are new. A stained window has been placed in the Coomb chapel. A warm air ventilating apparatus has been provided. The architect was Mr. George Morgan, of King-street, Carmarthen; and the contractors Messrs. D. Jenkins, and D. and G. James, Llanstephan for the masonry and carpentry respectively.

MIDDLESBOROUGH.—The new R. C. Church of St. Mary has just been opened. It has been erected after the designs of Mr. Goldie, and consists of a nave and aisles, chancel and lateral chapels (transeptal chapels not yet built), priests' sacristy, 30ft. by 21ft., and western transepts, forming a porch and a baptistery. The dimensions are 150ft. long by 62ft. wide across the nave and aisles, and 88ft. across the transept. The presbytery (for four priests) is connected with church and sacristy by a corridor. The principal front to the street is over 66ft. in width, by the same height to apex of nave gable, which is lighted by three traceried windows, two of two lights and one of three lights. The upper part of the gable is enriched by panelling, and two niches containing large statues of angels. The chief doorway opens below the central window, and is worked out in ornamental brickwork, with bands of enrichments in terra cotta. On either side of the doorway, on projecting corbels, and covered with low canopies, are statues of Our Lady and Child, and St. Joseph. The two western transepts flank this great central gable, and conceal the ordinary sloping termination of the side aisles. A lofty tower and spire, of 154ft. in height, is projected at the south-west end of the façade, but is not yet built. The floor, except the chancel and the chapels, which are tiled, is laid in wood blocks. Pitch-pine open seats and confessionals are disposed in nave and aisles, the latter occupying temporary recesses in the arches of the future lateral chapels. Above the high altar is a large painting by Cottignola, who flourished in 1528, representing our Lady and the divine Infant seated in the clouds surrounded by a choir of angels. The north-western altar has above it a painting of "Our Lord," by Westlake, with saints in adoration.

SMETHWICK.—The Smethwick and Harborne School Board has just commenced the erection of a new block of schools on a piece of land forming the corner of Balton-street and Corbett-street, situated near the old Windmill, Smethwick. The building when complete, will accommodate 722 scholars, and will have large class-rooms attached for boys, girls, infants, and babies respectively. The ventilation will be effected by means of a series of shafts conveying into and having their outlet through the tower proposed to be built on the eastern corner of the structure, and Haydon's system of heating will be adopted. A suitable teachers' residence will form a separate block of the building. The contract has been let to Mr. J. Hartley, of Birmingham, who will carry out the works under the superintendence of Messrs. T. C. and J. P. Sharp, of Cherry-street, Birmingham, the architects to the Board.

WARRINGTON.—The foundation stone of St. Barnabas' Church was laid on Saturday by Lord Winmerleigh. When completed the church will consist of nave, 90ft. by 30ft.; north aisle, 87ft. by 12ft.; south-aisle, 70ft. by 12ft.; chancel, 27½ft. by 20ft.; organ chamber, 16ft. by 14ft.; vestry, 14ft. by 14ft., with heating chamber under and a tower and spire about 130ft. high. The committee has at present only entered into contracts for the erection of the nave and the vestry, accommodating 400 people, at a cost of £3,250, the intention being to enclose the nave arcading and the chancel arch with temporary walls until additional funds will allow of contracts being entered into for the chancel and organ chamber, for the north and south aisles, and last for the tower and spire, the cost of the whole building being estimated at £7,000 (to accommodate 730). The church is being erected from designs prepared by Mr. William Owen, who was selected in a competition with three other architects. The style adopted is an Early type of Gothic, the material used for the walls being grey brick with red Runcorn stone dressings and mouldings of red Ruabon pressed bricks. Internally the church will be faced with brick, and will have open timbered roof of pitch pine with seven pairs of ornamental princi-

pals finishing on stone caps, with columns and corbels beneath. The roof will be 48½ft. high to the apex from the nave floor. The nave arcading will have stone pillars 2ft. diameter, with stone bases and caps, and red pressed moulded and splayed brick arches and label moulds; over these arcades are the clerestory windows in stone, 3 lights in each. The west end will front Lovely-lane, and the tower and spire will be at the south angle of the west end. The west window is in 5 lights, and has the head filled in with tracery. The lighting by gas will be effected by a row of jets on each side the nave, beneath the clerestory windows as at Chester Cathedral. The present contract is let to Messrs. Gibson and Son, who have sub-let the masonry to Mr. E. W. Gittens, of Orford-street, Warrington.

WARWICK.—The new Middle School on the Butts is completed and ready for occupation. It consists of a master's house and school buildings to accommodate 125 boys—viz., schoolroom, 50ft. by 25ft; three class-rooms, 24ft. by 16ft., with lavatories, &c., a covered and very large out-door playground. The whole of the buildings are of brick, with stone dressings. The style is Early Domestic English, high-pitched and gabled roofs, covered with Ruabon tiles. The architect was Mr. Cundall, and the builder Mr. Thos. Mills, both of Leamington. The Grammar School, on the Myton or Old Warwick-road, is also rapidly approaching completion, the whole of the buildings being roofed in, most of the floors laid, and the plastering well in hand. The buildings are planned to afford educational accommodation for from 250 to 300 boys, with cooking accommodation for half these numbers, and lodging for 70 or 80 boarders. The head-master's house forms the western wing, and a chapel with 200 seats, now in course of erection, will form the eastern wing of the group. The style of the buildings is that of a mixed Late Tudor. The materials are also bricks, with stone dressings, with more elaboration of ornament than in the Middle School, as befitting the pretensions of a collegiate institution. The tiles used are those of Edwards, of Ruabon. The grounds, about fourteen acres, are the gift of the trustees of King Henry VIII.'s Charity. The buildings will be completed by the beginning of next year. The architect is also Mr. Cundall, and the builder Mr. George Smith, of Milverton.

Messrs. Giles and Brookhouse, architects, of Derby, inform us that the extras on the three new board schools at Belper, opened last week, amounted to less than £440, and not £1,725, as stated in our last issue. Our authority was a Sheffield journal.

A hydrophatic establishment is in course of erection on the Hencotes-road, Hexham, from the designs of Mr. Newcombe, of Newcastle-on-Tyne. It stands in grounds of 18 acres, and is planned to accommodate one hundred inmates. Messrs. N. and R. Reid, of Newcastle, are the contractors.

The new watering-place of Skegness, near Boston, Lincolnshire, is about to be sewered in accordance with plans prepared by Mr. David Balfour, C.E., of Houghton-le-Spring, engineer to the rural sanitary authority of Spilsby.

A new Welsh Wesleyan Methodist chapel was opened on Monday week at Penygroes, near Carnarvon. The building has been erected at a cost of about £1,100, by Messrs. Pritchard, from the designs of Mr. Richard Davies, architect, Bangor. The style adopted is Classic. There is accommodation for 300. The seats and other woodwork are of pitch pine.

About two-thirds of the tunnelling of the Gothard Railway is now completed—11,200 metres out of a total estimated length of 14,900.

Works of water supply are about to be carried out at Dawley, Salop, from the plans of Mr. Slack, C.E.

Mr. Mansergh, C.E., has been instructed by the Corporation of Durham to report on the possible sources of a better supply of water for the city.

The Liverpool Town Council have decided to continue the borings for water at Bootle (temporarily suspended at 1004ft.) to a further depth of 300ft., and the contractors—Messrs. Mather and Platt—have been authorised to proceed with the operations.

The South Shields Town Council on Wednesday week resolved to promote in the next session of Parliament a bill giving, besides greater urban powers to the authority, full powers for the erection of a town hall, public buildings, and offices, at a cost not exceeding £30,000, and the purchase of a people's park, at a cost not exceeding £20,000.

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TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.]

All letters should be addressed to the EDITOR, 31, TAVISTOCK-STREET, COVENT-GARDEN, W.C.

TO OUR READERS.—We shall feel obliged to any of our readers who will favour us with brief notes of works contemplated or in progress in the provinces.

Cheques and Post-office Orders to be made payable to J. PASSMORE EDWARDS.

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Cases for binding the half-yearly volumes, 2s. each.

HOMER. (There is no charge whatever.)—F. W. (Write the Secretary; the address is Whitehall, S.W.)—F. WALLIS. (Mr. Banister Fletcher, Spon and Co., 48, Charing-cross, S.W.)—P. (Gwilt's, Longmans and Co.)

RECEIVED.—J. F.—F. M. W.—W. T. A. and Co.—S. and W.—G. G.

DRAWINGS RECEIVED.—P. and Son.—M. U.—R. J. W., Jun.—A. B.—B. B.—J. B. P.—W. Y.—E. T. H.—S. P. P.

Correspondence.

THE BROMPTON ORATORY.

To the Editor of the BUILDING NEWS.

SIR,—Our attention has been drawn to the letter of a correspondent in your last impression, stating that the design for the new church of the "Oratory," chosen for execution, is that to which the first prize was awarded, and also that the services of its author, Mr. Herbert A. Gribble, are secured in carrying out the building.

Whilst this information is correct as far as it goes, will you allow us to complete it by saying that the execution of the building has been entrusted to the joint care of—Yours, &c.,

HERBERT A. GRIBBLE,
J. T. WALFORD.

24, Colville-terrace, W.

CLOISTERS.

SIR,—With reference to the particulars given respecting cloisters on page 249, allow me to say I was at Chester more than a year ago, and then the cloister was restored on the side next the nave. Those at Christ Church, Canterbury, are on the north side. At Lincoln as well as at Hereford, the side away from the church has disappeared; at Peterborough they have gone, at Ely I do not remember any, at Westminster Abbey they pass behind the great buttresses of the nave and occupy the site of the south transept west aisle in a way unique, I believe. The garth at Norwich is, I believe, the largest in this country, and the cloisters are probably the most perfect remains we have, most others having been repaired or restored or rebuilt in part to regain a lost entirety.—I am, &c.,

CLOISTER.

AN ACT OF VANDALISM.

SIR,—The walls and guard towers of Newcastle-on-Tyne were formerly the most magnificent in the kingdom. Indeed, an old authority asserts that few towns in Europe possessed such ramparts. Not many years ago—indeed, within the recollection of the oldest inhabitant—these walls and towers existed to a large extent in a good state of preservation. Unfortunately, the spirit which actuated the people of York, and which compelled the authorities to preserve intact the walls and gates of that city, did not prevail here, and one after the other the old gates and towers of this town have been swept away for trivial reasons, together with the adjacent walls, until now little remains of what was formerly the chief glory of the town. The Town Council recently determined upon the erection of a free library, and upon a portion of the site selected stands the Carliol Tower, the most interesting of the old towers remaining. There is ample room for both the free library and the tower. Mr. Oliver, an ex-town councillor and an architect of repute, who originally suggested the site, prepared plans at his own expense to show how the necessary building could be arranged without interfering with the tower; but for the sole apparent reason of obtaining a straight line of frontage the borough engineer proposes to demolish this most interesting feature.

It is a most singular phenomenon that, whereas in York everything appertaining to the part which possesses any intrinsic interest is most religiously preserved, in Newcastle, only eighty miles further north, vandalism is rampant.

I suppose the only explanation is this, that York is a city of resident families, who are consequently most intimately acquainted with its history, and keenly sensitive to the value of its memorials of the past. In Newcastle, on the contrary, the population is composed largely of people coming from a distance and abroad, who know nothing of and care less for the history of the town, their one thought being, "make haste to be rich."

As in former cases, I trust you will lend your powerful aid against the perpetration of this fresh act of vandalism.—I am, &c.,

NOVOCASTRIAN.

CROWLAND ABBEY, LINCOLNSHIRE.

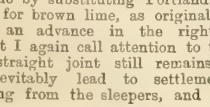
SIR,—Having only recently visited the interesting remains of the abbey of St. Cuthlac, at Crowland, I was interested in the account given in the BUILDING NEWS of the more recent visit of the Royal Archæological Association, but regret to find no notice recorded of the exceedingly interesting font which occupies a rather elaborately groined recess on the right-hand side of the north aisle, now the parish church, on entering from the western, formerly the north-western, tower. Mr. J. Tom Burgess, F.S.A., has elsewhere described this font as a stoup, but its size seems to suggest that such term could hardly be correctly used, notwithstanding the presence of the more ordinary font of later date now in use in the church, the older one being simply allowed to remain in a dirty and neglected condition if not as a receptacle of rubbish. I do not remember having seen an example similar to the font at Crowland anywhere else in England, and no notice, as far as I can find, is given of it in any published works on the subject. Its peculiarity chiefly consists, it seems to me, in its being built on to and forming part of the main building. There are several examples, I believe, of fonts being partly connected with the walls of the churches which contain them, as at Little Selford, Cambridgeshire, where the font is built into the pier of the belfry arch. We have also large fonts constructed for the purpose of immersion, as at Cranbrock, Kent, or erected in a sort of detached baptistery which formed a screen round the font, built, however, in a permanent manner, as at Luton, in Bedfordshire. This is illustrated in Simpson's "Ancient Baptismal Fonts." Temporary wooden screens were also used, and of these one remains at Trunch, in Norfolk, while at Fingringhoe Church, Essex, a wooden cover opening in three leaves like a triptych is to be seen. No doubt many other examples of unusual treatment of fonts and baptisteries could be named,

but none appear to be similar to the one at Crowland, where it occupies and forms part of the recess which acts as a canopy over it. I do not know if the level of the floor of the church has been raised but the step down to the font is curious. Some one who is better acquainted with the abbey may be able to oblige with further particulars. There is another point not mentioned in your report already referred to which is worth naming, and that is the opportunity afforded of examining how piers of later date were built upon those of an earlier church. An opening was made into the north-west pier of the crossing of the abbey church not long since, for the purpose of such an examination, and this opening remains. With regard to the carving on the west front, now in a very ruined condition, one cannot fail to observe how very sharp and perfect some of the old foliage is, and how unusual in English work is some of the niche-like treatment of canopies in conjunction with figures and foliage in some of the caps. The gallery immediately over the altar can only be mentioned to be condemned. Your reporter expresses surprise that the old triangular bridge in the village spans a dry road, although on the occasion of the visit recorded it was an exceedingly wet day. This is to be accounted for by the fact that the original water-course through the main streets of the town was a few years since arched over, so that it now runs below the level of the present roadway.—I am, &c.,

MAURICE B. ADAMS.

TRAMWAYS.

SIR,—Two years ago I troubled you with my suggestion for the better construction of the rails of tramways, by the adoption of which the greatest evil connected with them might be avoided—viz., the "ruts" formed by the straight joints of the granite with the timber sleepers. Can it be expected that eight straight joints, formed by a double line of sleepers, will keep in order for any length of time? Experience, and the constant employment of numbers of men to repair them, give a decided negative to the question. I see in the relaying of large portion of the Hampstead-road and Holloway line some little improvement has been made by substituting Portland cement concrete for brown lime, as originally used. This is an advance in the right direction; but I again call attention to the fact that a straight joint still remains which must inevitably lead to settlements of the paving from the sleepers, and I again



submit that until my suggestion, or a modification of it, is adopted, the evil will continue. I suggested before (and through your kindness would again) that the only effectual remedy would be a modification of the rail used some years ago on the Great Western Railway, a sketch of which I give above. This arrangement would allow of the stores taking *a bearing* on the sleeper, and prevent those dreadful ruts which wrench off our carriage wheels, and occasionally land some trusting traveller on the pavement. I have no interest to serve in this matter but the public, and should be glad if you will give this letter and sketch a place in your journal. No wood sleeper would be required, the bearings, A B, would effectually take all the weight.—I am, &c.,

WM. ALLEN DAVIS, Architect.

New transepts and chancel are to be built to St. Matthew's Church, Iri-ktown, Dublin, at the cost of £2,500. Mr. J. F. Fuller is the architect.

On Saturday Mr. S. J. Smith, C.E., Government inspector, held an inquiry at Crumpsall relative to an application of the local board to borrow £6,000 for works of sewage and paving. The clerk to the local board explained that Lower Crumpsall had been well sewered to a certain extent, but for the upper portion of the district there was no sewerage whatever. The inspector warned the local authority that they were contravening the Rivers Pollution Act by draining into the river Irk, and suggested that there was a natural filtering bed near the town, where the sewage might be treated.

Intercommunication.

QUESTIONS.

[5502.]—**Value of Land.**—Will some one help me to obtain the value of a triangular piece of land, at the corner of two roads which cut obliquely? It has a frontage of 10ft. to main road, 65ft. frontage to side road (a blind one), and is 100ft. deep at one end, and tapers to nothing at the other. Land is selling at £4 per foot in main road. The purchaser will have to make up road and pave the footpaths round site in a short time.—B. W.

[5503.]—**Brickmaking Machine.**—Will some reader kindly inform me of the best machine for making building bricks, say, from 500 to 2,000 a day by hand or horse-power? It is not the mixing the clay machinery I wish to know about, but the moulding and making of the brick ready for the kiln.—A SUBSCRIBER.

[5504.]—**Arches.**—In Hurst's "Handbook" under this heading occurs the expression "horizontal thrust at springing in terms of the area," the area being in feet. As I have been accustomed to express thrusts by weight, and not lineal measure, I should like some of your correspondents to explain this to—PUZZLED ONE.

[5505.]—**American Timber.**—Would your correspondent, "W. S.," or some reader equally well informed on this subject, kindly say what is the botanical name, for what is known in Northern America as "white pine"—not the spruce fir, neither the "yellow" pine? And will the white pine stand well in framings such as doors?—S.

[5506.]—**Ventilating Cesspool.**—Behind my house a cesspool has been constructed, into which a water-closet with trap runs. The cesspool is tight, and ventilated by one shaft of rain pipe running out of it to the roof. I have reason to doubt this mode of ventilation. Will any of your readers inform me if a pipe from a closed cesspool will ventilate?—DOUBTER.

[5507.]—**Painting Cemetery Chapel.**—How is it best to paint the walls, and especially the east end, of a small cemetery chapel, so as to produce an effect of quiet and reserve? There are large windows of plain glass east and west, and three smaller ones on the north side, so that there is much light to contend with. The style is Early Decorated. Any information as to mode of treatment, suitable colours, and the best process to employ, will be thankfully received. Also, whether there are any good examples of mural painting within an easy distance of Shrewsbury.—B.

REPLIES.

[5488.]—**Strength of Wood Posts.**—I am obliged for the replies of "J. S." and "G. H. G.," but they only land me in my former difficulty. I work out the results thus:—For a 12" square post 5' 6" long, according to Hurst, 312 tons; according to Spon's "Builder's Pocket-book," edited by Young, 5,353. The replies inform me that the latter formula is only applicable to long posts, which leads to this absurdity, that the longer the post the greater the weight it will support. I should feel thankful for some explanation of this apparent paradox.—M.

[5489.]—**Measuring Painting.**—The proper way to measure a door is the following:—Suppose it to be 7ft. by 4ft. out to out of architraves. Make a dimension of the height and width, and twice it for the door fronts. The architrave projection is added in the width. Next take the linings or the reveals, say 6in., and add it to the rebate—thus: take both sides of linings or jambs, say 6ft. 6in., and add them to the clear width of doorway. This makes one dimension, then the width of reveal and rebate makes another; place the former first, and the latter under for a sum. Square the dimensions so taken, and bill out at so many yards superficial, stating the number of oils.—G. H. G.

[5490.]—**Foundation Stones.**—The receptacle for documents or coins is usually cut out of the block of stone first set, commonly forming part of the plinth, though there is no definite rule. The duty of the architect on the occasion is simply that of presenting a trowel to the person who formally lays the stone.—G. H. G.

[5491.]—**Dilapidations.**—The tenant has undoubtedly a loophole in the case mentioned. He is bound only to paint 2 coats according to lease, if the reading is not clear on the point. If the graining is not in a bad condition I should be inclined to pass over this part of the repairs.—SURVEYOR.

[5492.]—**Measuring Buildings.**—In measuring old churches, &c., a rough freehand sketch must be made of the plan, and also of the elevation for the dimensions. After the dimensions are figured in, the sketches so made should be worked out to scale at once, and again taken and tested, when the detail can be sketched with greater precision. This is sometimes impossible, and in such cases it is best to plot the sketches roughly on the spot, leaving the detail for another visit. To obtain the dimensions of towers the best plan is to use measuring rods which can be applied at the different stages of tower, or to let down a tape from the summit, if practicable. When access is not possible the sketcher can take the heights by using an angular instrument, by calculating mentally how many times some unit or feature such as a door or window will be contained in the height—if the courses of masonry are equal as in brickwork this can readily be done—by estimating the height by means of similar triangles, or by making an angle of 45° with the top or height required, lately described in the BUILDING NEWS. A very useful instrument lately introduced would be found of great service to the sketcher. But a great many dimensions can be readily obtained by proportionment.—SKETCHER.

[5493.]—**Dublin.**—"Anglian" should visit, in Dublin, first, Christ Church Cathedral, recently restored by Mr. G. E. Street, making it a point to see the crypt of same; then St. Patrick's Cathedral; then St. Audoen's Church, which are all close together. Next the Castle, where the Record Tower (once the State prison) is of importance, and can be seen by an order from Sir Bernard Burke, whose office is in it. After which the Bank—once the Irish House of Parliament—one of the porters will be only too glad to conduct "Anglian" over it. In the Lords' Room, still kept intact, are some fine specimens of Irish tapestry. The above will furnish ample material for sketching, especially Christ Church, which is very "national" in its details. The Four Courts and the Custom House, by Gandon, are worthy of a visit. The modern buildings are numerous, many of which will be seen on the route to the above, and are always open to inspection; but when in the vicinity of Christ Church "Anglian" should drive to Guinness's brewery, and, getting a ticket in the office, a guide will be appointed to conduct—a few hours here will be well spent. Next Trinity College, and from that to the Royal Dublin Society, in Kildare-street. A visit should also be made to the Royal College of Science, Stephen's-green, to see a collection of all the Irish marbles, which are empanelled in the hall, and the different granite, limestones, &c., of the country. Before leaving Dublin a drive should be taken to St. Doulough's, six miles out on the Malahide road, to see one of Ireland's old stone-roofed churches, which will more than compensate for the time; it possesses many interesting features, amongst the rest one of the first staircases ever built in Ireland. "Anglian" should also visit the new bridges over the river, and, above all, go to the North Wall, to see some of the 300-ton blocks of concrete being carried and set in their places. Mr. Stoney, the engineer, will always be found courteous in allowing visitors on the works. Within a radius of 30 miles are, briefly, the Seven Churches of Glendalough, to be visited first; St. Canice's Cathedral at Kilkenny, round towers at Kildare and Clondalkin, the old crosses and ruins at Kells. The above will fully occupy "a few days;" but Clonmacnoise may be done in another, if time can be found; here will be seen some of the most beautiful crosses in Ireland. Cromlechs, raths, cairns, &c., abound all over the country; but if "Anglian" will enter freely into conversation with the "jarvey," or the wild Irishman he meets in the country districts, he'll learn their locality better than can be described here, and what is just as valuable (?) their history and the architect's name, which invariably is—GOBAN SOAR.

[5498.]—**The Lancet Style.**—This style is characterised by a degree of lightness and elegance not to be found in any preceding style, which consists in the high roofs and gables, the elongated window, slender shaft, and high pinnacles and spires; the lancet as well as the equilateral arch was used during this period. The mouldings chiefly consist of alternate rounds and deeply-cut hollows, in which tooth ornament is frequently introduced, and used only in the architecture of this date. The doorways are occasionally very rich, being deeply recessed, and the upper mouldings of capitals were mostly continuous, and from them spring assemblages of small bead and hollow mouldings, covered by a projecting dripstone, ending and supported on each side by a corbel knot of foliage. The doors were never panelled, the timbers being generally laid diagonally. The piers are generally clustered or shaped like a large cylindrical shaft, with four or more smaller shafts surrounding it, and were often divided into shorter lengths by small horizontal belts or mouldings placed round them at intervals, the shaft immediately in front of the pier being carried up to support the vaulting. Porches are usual, and sometimes had a room, over which is called a parvise. The windows are long and narrow, the jambs having slender shafts with moulded capitals, surmounted by arch mouldings and dripstone, the dripstone sometimes being continued from window to window, to form a string-course. The buttresses of this date are very prominent, sometimes having the angles chamfered, or small shafts inserted, not projecting beyond the face. Flying buttresses are occasionally met with, though they are chiefly confined to Continental buildings of this date. The walls are often decorated by blank arcades and pointed arches with small columns and caps. The vaulting is generally divided into cellular compartments, corresponding with the pier arches, and inclosing the side windows, the joints or seams where the arches intersect are usually covered by moulded ribs, and the intersection of ribs at top of vault is crowned by a sculptured knot of foliage. Spires were built upon square towers, at the interception of transepts, west end, or side of nave. They are usually built square two-thirds of their height, and are generally broach spires; but they may spring from within the parapet, and often have projecting windows with vertical faces at intervals. For examples see Salisbury, Lincoln, Ely, Beverley, and Wells.—W. W.

LEGAL INTELLIGENCE.

WARMING A NEIGHBOUR'S HOUSE THROUGH PARTY WALL.—Among several summonses taken out by the Metropolitan Board of Works under the Dangerous Structures Act, before Mr. Flowers, at Bow-street, on Saturday, were two against the owners and occupiers of Nos. 39 and 40, Drury-lane. Mr. Napier appeared in support of the summonses. He said the owner of No. 39 had caused one of the recently-invented cooking ranges to be placed in an ordinary fireplace without having the proper fire bricks placed in the flue. The result was that the party wall became so heated on the side belonging to No. 40 that a thermometer burst at 200 degrees when placed against the wall, and a match placed in the same place ignited without the least friction. The owner of No. 40 admitted the danger, and had consented to an order being made for his share of the necessary work to be completed in 28 days. The owner of No. 39, the person whose action had created the danger, however, resisted the application for the order. Mr. Robert Walker, district surveyor of St. Martin's-in-the-Fields, said the last Building Act was passed before these kitcheners were invented, and consequently no provision was made for these cases. In a similar case, in St. Martin's-lane, a fire had almost broken out in the next house. Mr. Flowers said he should deal with the party wall as with a dangerous structure. The owner of No. 39 remarked there would be no danger at all if the people in No. 40 had not put up a lot of wooden fixings next to a party wall. Mr. Flowers observed that this statement would decide him to make the order against the owner of No. 39. The owner of a house certainly had the right to put up what fixings he liked. He then made the order for the necessary work to be done in 14 days.

STATUES, MEMORIALS, &c.

BOMBAY.—The four panels designed by Mr Boehm to decorate the pedestal of the equestrian statue, commemorating the visit of the Prince of Wales to Bombay, were shipped last week. The panels, which weigh upwards of three tons, have been cast from the original plaster model by Messrs. Elkington, of Myddelton-street, Clerkenwell, and are as follows:—The first, the reception of the Prince by the native chiefs; the second, a procession of native women bearing offerings in the shape of flowers and fruits; the third, the Royal arms; and the fourth, a huge square panel bearing the following inscription:—"Albert Edward, Prince of Wales, K.G.C., C.S.I. In commemoration of the visit of his Royal Highness to India, 1875–76, Sir Albert Sassoon presented this statue to his fellow-townsmen of the Royal city of Bombay." The panels since being cast have, to obviate atmospheric influences, been thickly coated under the electrotyping process.

STAINED GLASS.

KINGSBURY.—A stained glass window has been erected in the north aisle of Kingsbury Church, near Tamworth. The subject "The Good Samaritan," occupies three lights. The window has been erected by Mr. Swaine Bourne, artist in stained glass, of Birmingham. To the artist it has been a labour of love, as it is in memory of his father.

MEMORIAL OF SIR GILBERT SCOTT.—Through the liberality of Mr. Alfred Bell, of Bayford House, Hampstead, a member of the firm of Bell and Clayton, artists in stained glass, a stained glass window has just been placed in the north gallery of the parish church of St. John, Hampstead. Its central figure is a likeness of St. Thomas, the margins being filled in with fruit and flowers. The inscription runs: "In grateful memory of Sir George Gilbert Scott, Knight, by one sometime his pupil.'

WATER SUPPLY AND SANITARY MATTERS.

ABINGDON.—A Local Government Board inquiry was held at Abingdon on the 4th inst., before Mr. Thornhill, C.E., respecting application from the town council for sanction to borrow £10,000 for works of water supply. Mr. Bailey Denton, C.E., produced plans of the proposed scheme, explaining that the water was to be brought from a boring at Wootton, and that it was hoped to obtain 60,000 gallons a day—equal to 10 gallons per head—by supplementing this supply with that from other springs. In reply to questions Mr. Denton said it would be "a very close run" for the town to get sufficient water without having recourse to the river.

During the progress of the sewerage works at Winchester a large quantity of fragments of both fine and coarse pottery and glass of Roman workmanship, a spear head, and some coins of the later Emperors have been found, besides comparatively modern abbey tokens. All these objects have been disinterred outside the city boundaries.

CHIPS.

The Bournemouth Town Commissioners have new decided to proceed at once with the Boscombe sewage outfall, and the tender of Mr. A. Howell, of Poole, for the supply of 1,400ft. of 2ft. 6in. iron piping for carrying the sewage out to sea has been accepted—the price to be £4,671.

The Brighton and South-Western Railway Companies have just commenced the works at Ryde for the enlargement of Ryde pier and the improvement of the railway link between the pier and St. John's-road (Ryde) station. The costs of the works will amount, it is said, to £150,000. The Solent railway tunnel project is to be brought before Parliament during next session. The cost of 15 miles of railway, including the tunnel, is estimated by the engineer, Mr. Hamilton Fulton, at £50,000.

Some correspondents of the *Scotsman* complain of the eyesore caused in the ruined choir of Elgin Cathedral by the comparatively recent erection of a granite block, commemorative of Dr. Lachlan Shaw, a county historian, on the ancient site of the high altar.

The local board of Ashford, Kent, decided last week to carry out works of sewer ventilation under the direction of the newly-appointed surveyor. The estimated cost, according to the report of Mr. Mansergh, C.E., is £1,200.

A new national school was opened at Llansaintffraid on the 23rd ult. Mr. Hurst, of Welshpool, was the architect, and Mr. Pickstock, of Hereford, the contractor.

Works of sewage are being carried out at Honiton for the Town Council. Mr. Ellis, C.E., of Exeter, is the engineer, and Messrs. Hutchings and Berry are the contractors. The work was formally commenced on Wednesday.

The foundation stone of a new R.C. church of Our Lady of the Assumption has been laid at Magherafelt by the Primate of All Ireland. The church will be in the Early English style, and will cost about £7,000. Messrs. O'Neill and Byrne are the architects.

A new wing is to be built to the Assembly's College, Belfast, at the cost of £9,000. Mr. John Lanyon is the architect.

A carved pulpit in alabaster and coloured marbles, from the design of Mr. J. O. Scott, architect, has just been placed in the new parish church of Slough, and executed by Mr. Henry Terry, of Lambeth Palace-road. The consecration of this church by the Bishop of Oxford will take place on Tuesday, the 24th instant.

A new pulpit and organ have been erected in St. John's parish church, Glasgow. The woodwork of the organ case is richly carved. Both have been designed by Mr. John Honeyman, architect, and executed by Messrs. Forster and Andrews, Hull.

The Taunton Town Council, at its meeting on Tuesday last, re-appointed Mr. George C. Shawbridge borough inspector for a term of five years.

The foundation stone of a new Church of England mission-room and coffee-house was laid in Regent-street, St. Mary's parish, Scarborough, on Saturday. The cost, with site, will be £2,100.

Water has been let into the new dock at Goole, which will be very shortly ready for formal opening.

Additions are about to be made to the Hexham Board Schools, in accordance with plans prepared by Mr. Oliver, of Newcastle-on-Tyne. The cost is estimated at £2,000.

New educational buildings are in course of erection at Taunton's School, Southampton, for the Endowed School Governors. Mr. Critchlow is the architect, and Mr. Bostock the builder. The fittings have been supplied by Mr. Hammer, of London.

The Belfast Town Council have adopted a report from a committee declaring it desirable to erect covered markets on the west side of a new thoroughfare now being made from Donegal-place to York-street, at a cost for building not to exceed £20,000. The report will be further considered at the next meeting of the town council.

A new Roman Catholic chapel, dedicated to the Sacred Heart of Jesus, was opened at Fareham, Hants, on Wednesday week. Messrs. Fullford and Bays are the builders.

The foundation stone of the Inverness High School was laid on Saturday, The building will cost nearly £5,000.

The Frome local board having ascertained the quality and quantity of water supplied by the Egford experimental well, have decided to adopt the spring as the source of the new water supply for the town, and have instructed Mr. Tomlinson, their engineer, to prepare the necessary plans and estimates.

The *West Briton* says it is not generally known that Mr. Pearson, the selected architect for the Cathedral, has been connected with the city of Truro, and his sister was formerly in charge of the depository in that city of the Society for Promoting Christian Knowledge.

Mr. Hormuzd Rassam will leave England again on the 20th to resume work at Nineveh, where excavations have been conducted during his absence by his nephew. It is probable that the Kouyunjik Library will be thoroughly explored by March next. Some 400 fresh tablets are on their way to the British Museum.

The tender of Messrs. T. Obank and Sons has been accepted by the Bradford School Board for the erection of schools at Belle Vue, Manningham.

It is proposed to restore the parish church of Kettering from the designs of Mr. G. E. Street, R.A.

The Town Council of Batley, Yorks, have instructed Mr. Bateman, their engineer, to prepare plans and specifications for a third reservoir at Ramsden.

A new school chapel at Broad Eye, near Stafford, erected under the superintendence of Mr. Robert Griffiths, county surveyor, was opened yesterday (Thursday).

The Russians are erecting at Erzeroum an enormous monument to the memory of the soldiers of the garrison who fell by the sword or disease during the Turkish war. The memorial represents a Russian sentry keeping watch over a series of tablets on which are inscribed the names of the regiments which have suffered much during the Russian occupation, and a list of the officers buried beneath the mound. The sculptor, a Russian named Yarnush, expects to finish the memorial by the middle of next month.

The Berkshire Archæological and Architectural Society visited Bray, Ockwell, Shottesbrooke, and White Waltham yesterday.

During the progress of works of restoration at Isel Church, near Carlisle, a thick brass plate, 21⅝in. × 4⅝in., has been disinterred on the south side of chancel, bearing an inscription to Thomas de Sandes, who died in 1415.

The external repairs and decorations to the City Guildhall and its offices are now almost completed, after having occupied the workmen for a period of six weeks. The whole of the walls, the windows, window-frames, &c., have been repainted, and a fresh coat of gilding has been put upon the towers, the vanes, &c. Mr. James Mackintosh, of Langham-street, E.C., has executed the work.

The church of Maryport, Cumberland, is about to be restored from the designs of Mr. C. J. Ferguson, of Carlisle, at an outlay of £600—the proposed work including the laying of white marble and tile pavement in chancel, the alteration of the present vestry into an organ-chamber, the erection of new vestry over heating-chamber on south side of chancel, and the addition of a lectern to the church furniture.

A parsonage-house is about to be built at Ketley, Salop, from the designs of Mr. Edward Haycock, at a cost of £1,700.

A new Free Church was opened at Dykehead, Shotts, N.B., on Thursday week. It is Gothic in style, and seats 450 persons.

At Cranford, Northhants, some holy communion vessels, which had long been lost sight of, have recently been recovered. The chalice, which is of good form and character, bears date 1575. They have been carefully restored, and will be brought into use.

At the monthly meeting of the Smethwick Board, on Tuesday week, Mr. W. F. Clayton, surveyor, resigned his office in consequence of having been appointed engineer and surveyor to the drainage and sewage works of Leicester. The salary for his successor was fixed at £200 per year.

The parish church of Kirkoswald, in Carlisle diocese, is about to be restored from the designs of Mr. Cory. The north and south aisles are to have open roofs in place of present ceiling; an oak roof is to be placed beneath the present ceiling of nave, and the north aisle is to be partially rebuilt. The structural alterations will cost about £1,000.

The Town Council of Northampton discussed at their last meeting the advisability of putting their works of drainage, &c., out to contract. It was decided to continue the present system of having the work carried out by the borough surveyor, but a report by a committee was adopted, recommending that a more stringent supervision be exercised during the progress of the works and over the men employed. The surveyor, Mr. Pidson, stated that the present staff was insufficient owing to the rapid growth of the town; the work with regard to which the discussion arose—the culverting of the town from the Midland station to West Bridge—had cost less than if it had been done by contract. The work had just been completed for £4,949, and his original estimate was £5,050.

The Improvement Committee of the Court of Common Council have under their consideration the desirability of improving the approaches to London-bridge, and also of widening Upper and Lower Thames-street, and some of the streets in the immediate locality. The object of the committee is to relieve the existing heavy traffic, and to afford additional vehicular accommodation.

Our Office Table.

THE *City Press* gives the following biographical particulars as to the new Sheriffs for London and Middlesex, Messrs. Burt and Bevan, who will be admitted into office on the 28th inst. Mr. George Burt was born at Swanage, Dorset, on October 2nd, 1816. His father, Mr. Robert Burt, was a stone merchant there, and brought up his son to follow the same trade. At the age of 19, the late Mr. Mowlem (also a native of Swanage, and Mr. Burt's uncle) brought him to London, and in 1844 Mr. Mowlem took Mr. Burt and Mr. Freeman into partnership, the firm from that time being known by its present title of "John Mowlem and Co." The senior partner died in 1868, and the business was carried on by Mr. Freeman and Mr. Burt until 1875, when Mr. John Mowlem Burt, the elder son of the newly-elected sheriff, was taken into partnership, and these three gentlemen now constitute the firm so well known in London as road and general contractors, and in Aberdeen and Guernsey as quarry-owners. They were the first to manufacture and lay down the pavement known as "narrow cubes." The first roadway so laid was that of old Blackfriars Bridge in the year 1840. Mr. Thomas Bevan is the son of the late Mr. Thomas Bevan, M.D., of Finsbury-circus, and was born in 1829. He entered business life in 1853 with Mr. J. M. Knight and Mr. Alfred Sturge, constituting the firm of Knight, Bevan, and Sturge, who carried on for many years the business of cement manufacturers at Northfleet, Belvedere-road, Lambeth, and Lime-street. Since the death of Mr. Sturge, and the retirement from business of Mr. Knight, the business has been carried on under the same title by Mr. Bevan, who has recently admitted into the firm his eldest son, Mr. Robert Bevan. It will be remembered that the introduction into the firm of Mr. Robert Bevan was made the occasion of opening a club and institute, erected by Mr. Bevan for the use of his large staff of workmen and others at Northfleet, at a cost of £10,000.

THE first exhibition of the Newcastle-on-Tyne Arts Association, established early this year for the purposes of promoting a taste for art generally, encouraging local art, and forming a school of artists for Newcastle, was opened on Friday night by a conversazione in the Assembly Rooms (in three of the apartments of which the exhibition is held). Artists, English, Scotch, and Continental, were invited some months ago to send contributions to the exhibition, and so large was the response that the Executive Committee had no little difficulty in selecting the best of the works. Between 700 and 800 pictures have been placed, and the exhibition, while containing not a few works of the highest class, is on the whole one of the best collections of paintings ever brought together in the provinces. Alma-Tadema, Frere, Tissot, Macwhirter, P. C. Comte, Orchardson, O'Neill, Cooke, and Faed, are represented by some fine works, and amongst the other artists whose paintings well received the most notice are J. W. Lawson, who sends his three pictures, "Imprisoned Spring," "A Merry Christmas," and "Dawn"—all illustrative of the "Children of the Great City"—Stuart Wortley, Houston, Pabst, Moore, Bircket Foster, Cassie, J. D. Watson, Perugini, Jules Rougeron, Pelligrini, Schmidt, Calthrop, Aumonier, Fantin, Watts, Paton, Otto Weber, Emmerson, Jobling, Sticks, Charlton (the animal painter), Surtees, Bréanski, Hering, Dicey, and Frank Walton. The exhibition will continue open several weeks, and should it prove successful it will become an institution. Considerable expenses have been incurred, but the promoters are liberally assisted by a number of local gentlemen, one of whom has generously offered to be a guarantee against loss.

AT the ordinary monthly sitting of the London Association of Foremen Engineers and Draughtsmen, on Saturday last, Mr. Butler read a paper on "Silicated Stone Pipes for House Drainage and other Purposes." The first section of the paper had reference to ancient and primitive modes of drainage, and to the defective material and imperfect workmanship in using them too often visible at the present time. The author next entered into a full and highly-practical description of the "silicated" stone pipes, which he maintained were far more efficacious, and would be found far more desirable, than any other known kinds of sewage ducts. The materials of which the improved pipes are wrought were stated to be Portland cement, incorporated with either granite chippings, Thames gravel, Kentish ragstone, or other substance of a like obdurate character. These ingredients are reduced to particles of uniformly small size by powerful machinery, and then united by the agency of water and mechanical stirring. Thus a kind of crystalised concrete is formed, and which may be easily put into any required form by means of moulds. The induration of the pipes is hastened and intensified by submitting them to the action of baths of silicate of soda.

THE fifth annual exhibition of modern pictures in oil has been opened at the Royal Pavilion, Brighton. The catalogue before us comprises many choice works. Of pathetic pieces we may name "Mariana," by Miss Eleanor Bell, valued at £250; "Reeling Bobbins for the Loom," by A. A. Hunt; "The Cloister Well," by E. R. Taylor, &c. Architectural pieces are scarce. We notice "The Presbytery, Chichester," by R. H. Nibbs, clever in parts; "View of Parliament-street from the National Gallery," by Miss Ellen Johnson; "An Old Street, Normandy," by Miss Alice Manly; "Old Hornsey Church," by Lewis Chappell; "Interior of a Martello Tower, Pevensey," by E. W. Cooke, R.A.; "Views of Windsor," several pleasing sketches of Sussex scenery, "Martello Tower, Eastbourne," by R. H. Nibbs. Several artists of note appear; thus we find the names of A. Davis Cooper, T. F. Goodall, E. R. Taylor, T. F. Wainwright, T. Davidson, J. J. Mayall, A. Bierstadt, A. N. Rossi, J. R. Marquis, R.H.A., Beetholme, Kennedy, C. W. Wyllie, Ascroft, G. H. Barable, Henry O'Neil, A.R.A., Miss Grace, A. B. Donaldson, J. Lamont Brodie, David Low, C. Lambert, C. E. Cox Hayes, R.H.A., Sir Thomas Lawrence, Mayall, Devereux, Leatham Calcott, R.A., Clint, Talmage, White, Opie, R.A., Dance, R.A., &c. Those who desire to spend a few hours from the blue sea cannot do better than inspect the large collection of oil paintings of all conceivable subjects, and by many eminent masters, in the Gallery of the Royal Pavilion.

THE works in connection with the deep sea harbour at Boulogne were commenced on Tuesday. The new harbour was marked out by war vessels at anchor. It will be bounded on the north-east by the existing harbour, and will extend three kilometres west, the coast line forming its base, and the stone breakwaters will enclose a large portion of Boulogne roads. The existing east jetty of Boulogne harbour will extend 1,440 metres (4,710ft.) in a curved line towards the breakwater, where it will terminate in a lighthouse, having a north entrance 150 metres wide. The two breakwaters will be made by casting large blocks of stone into the sea, extending over a wide base, gradually diminishing up to the level of low-water mark, on which will be built a broad wall or quay of stone, filled in with Portland cement, rising two metres above the level of the highest spring tides, with a stone parapet two metres higher on the sea-side. On the outer side of these breakwaters, where the lower portion of the wall joins the foundations, the junction will be additionally protected from the action of the sea by layers or belts of artificial stone blocks measuring eight to ten cubic metres each. The new harbour exclusive of the foreshore, will contain a water area of 137 hectares (339 acres). The estimated cost of the undertaking is 17,000,000 francs (£680,000). The time required for the execution of the works will be 15 years.

MR. G. F. LYSTER, engineer to the Mersey Dock and Harbour Board, has issued his annual report on the general state and progress of the dock works at Liverpool and Birkenhead, and of the expenditure in his department from the 2nd July, 1877, to the 1st July, 1878. The engineer gives details showing that the new works are making rapid progress. The number of men now employed on these works, including those of the contractor, is about 3,000. The total quantity of excavations removed and deposited is 4,076,000 cubic yards, and the masonry, concrete, and brickwork built amounts to 594,000 cubic yards. At the south end new works, the excavations in connection with canal dock, east of Brunswick Dock, amounting to about 94,000 cubic yards of rock and other material, are completed, and all the other work is well forward. About 90,000 cubic yards of excavations have been removed in connection with the new dock southward of Brunswick Dock, and the river wall is progressing. Possession has been taken of the Harrington Basin, and preparations are being made to commence the construction of the intended lock on the site. Nearly the whole of the area for the graving dock and enlargement of the Herculaneum Half-tide Dock has been cleared down to the level of the quays, and the docks partially excavated. About 400,000 cubic yards of excavations, of which 125,000 are for the docks, and all in rocks, have been removed. Generally the works and docks at Liverpool and Birkenhead have been maintained during the year in good and substantial order. The expenditure of the year on Liverpool has been £642,829 0s. 11d.; Birkenhead, £96,887 9s. 3d.; Conservancy, £1,842 18s. 2d.; official charges, £14,043; landing-stage reconstruction, £685 12s. 7d.; dredgers and mud-hoppers, £17,704 0s. 4d.; total, £713,997 13s. 7d.

MR. JAMES HILL, of Upper Thames-street, has this week shipped to Cyprus for the War Department a quantity of locks and door furniture intended to be used for the officers' quarters there. We have seen samples of the locks in question, and as they appear to possess several important advantages over the ordinary rim locks, we think them deserving of special notice. The design (which Mr. Hill has recently registered) is altogether new, and the general finish is superior to anything we have seen at the price. They are made in several qualities; some with gun metal keys, and others with patent steel keys, which are nickel plated to prevent rusting, and combine in a remarkable degree both lightness and strength. These locks are well suited for Queen Anne and other revived Late styles of architecture, and will be largely specified by architects generally.

THE Iron and Steel Institute will hold its autumnal meeting for 1878 in Paris on Monday, Tuesday, and Wednesday next. The members will be formally received at the large hall of the Société d'Encouragement pour Industrie Nationale, in the Rue de Rennes, at 9 a.m., on Monday, when the president will deliver an introductory address, and other papers will follow. On Tuesday a general meeting of the Société d'Encouragement will be held in the morning, and in the evening the members' annual dinner takes place. On Wednesday a concluding meeting of the Institute will be held. The members have received invitations to visit three of the largest and most interesting of the French ironworks—those of Creuzot, H. Schneider et Cie.; of Terre Noire, Compagnie des Fondries et Foyes de Ferre Noir, La Voulte et Besseges; and of Hayange, Lorraine, Messrs. De Wendel.

WE regret to find in the list of the persons lost by the sinking of the Princess Alice steamboat the names of Mr. Charles Rowe Dillon, architect, of 5, Bartholomew-villas, Kentish-town, N.W., and his wife. Mr. Dillon was a pupil of the late H. L. Elmes, and had for many years acted as manager of works at South Kensington Museum, under Major-General Scott. In this capacity he took a prominent part in designing and superintending the erection of the new Science Schools, frequently illustrated by us in the spring of 1876. Mr. Dillon, who was about five-and-forty years of age, was well known in architectural circles; he had been an associate of the Institute since 1865, and his name was always to be found on subscription lists opened for the benefit of the profession. We notice also that the body of Mr. Alfred James Rouse, aged 41, architect and surveyor, of 150, New North-road, Islington, was amongst those identified on Monday, with those of several other members of his family resident in London and Oxford.

NOTICE OF REMOVAL.

CHUBB AND SON,
LOCK, SAFE, AND IRON DOOR MAKERS,
Have REMOVED their SAFE and LOCK BUSINESS to new and extensive Premises,
128, QUEEN VICTORIA STREET, ST. PAUL'S, E.C.
Illustrated Price Lists gratis and post-free.
Makers to the QUEEN, H.R.H. the PRINCE OF WALES, and the Bank of England.

CHIPS.

Claridge's patent asphalte, which is used for the carriage-ways, and laid in nearly all the courts of the Palace of Westminster, is now being applied to the extent of about 23,000ft. super. to the several carriage-ways of the Foreign-office.

The parish church of Barton Seagrave, near Kettering, is in course of restoration from the designs of Mr. R. Herbert Carpenter.

The Town Commissioners of Burton, at their last meeting, decided to abandon the scheme for removing the outfall of the sewage to the junction of the rivers Trent and Dove, and instructed Mr. Woolley, as acting for Mr. Clavey, their surveyor, during illness, to prepare plans for new clean-water drains from the breweries to the Trent, and for sewage tank enlargement. The work is being carried out under the supervision of Mr. Tarbotton, C.E.

The chapel of the Grammar School, Felstead, Essex, has lately had a large subject of the Ascension put up—being one of a series. It is painted on linoleum. The drawings of figures are from life conventionalised, bold in outline and colour, designed and executed by J. R. Thomson, 29, Gladstone-street, St. George's-road, Southwark, under the superintendence of the architect, Mr. F. Chancellor, of London and Chelmsford.

On Saturday last the first stone of Al Saints Church, an edifice to be erected for the use of the English colony, was laid in the Ile de la Croix, Rouen. The church is Norman in style, and a Tudor rose in mosaic is to be placed on the external west gable, so that the English nationality may be evident.

The waste mudlands adjoining the railway at Bevois Valley, near Southampton, is being reclaimed. Messrs. Bull and Sons are the contractors.

The Bournemouth Improvement Commissioners have appointed Mr. C. C. Creeke, who is retiring from the post of town surveyor, as consulting surveyor at a salary of £200 a year.

A medal has been awarded to the Silicate Paint Company, of London and Liverpool, whose paints received such favourable notice at the Paris Hygienic Congress.

The new South Shields workhouse is making rapid progress towards completion. Mr. J. H. Morton is the architect, and Mr. E. Suddard the contractor, the clerk of works being Mr. Cobham. The building, which is of brick, is intended to accommodate 700 inmates.

A new Lady altar was uncovered on Sunday last in the Roman Catholic Church of St. Francis, Chester. Mr. J. A. Hanley, of Chester, was the sculptor.

LANCASTER'S KILNS
FOR BURNING BRICKS, &c.,
(Patented in England, France, and Germany),
Effect a Great Saving in Charging and Discharging, and 50 per cent. of Fuel.
Apply to ROBERT LANCASTER, Leeds Brickmaking Company (Limited), Armley, Leeds.

VERITY'S AIR-PROPELLER.

It is quite beyond doubt that there are many times when if a constant supply of fresh air be necessary it must be pumped in—it will not come in of itself—and there are places where it can never be obtained without some artificial action. Messrs. Verity Brothers have patented an arrangement to effect this, which is simple and effective. It somewhat resembles in appearance an ordinary gas-meter, and occupies but small space. A cistern placed in the highest available position in the building in which the apparatus is to be used, and a ⅜in. lead pipe conveying the water to the machine, are all that is required. The internal mechanism consists of a drum, with a set of fans worked by a fly-wheel placed in the centre and on the same axis as the fans, which revolves on jewelled centres. Two mere pin-hole jets of water directed on to the fly-wheel put these fans in rapid motion. A current of air may be passed through the machine at the rate of 1,000ft. per minute and upwards, according to the size of the apparatus; reducing the supply of water by turning the tap, the revolutions may be brought down to three or four per minute, so that the current of air may be regulated to the nicest degree. A couple of machines, placed in proper position and nicely regulated, secure the result of an incoming current of the exact force required, and no more, and an extracting power equal to, or greater than, the inlet supply. The water, after working the machine, passes down through minute orifices across the inlet tube, and thus washes the incoming air. The invention is applicable to many wants, and ought at once to come largely into use.—Vide *Builder*, Aug. 3, 1878.

VERITY BROTHERS, Patentees and Manufacturers of Ventilating and Sanitary Appliances, 127, Regent-street, W.; Works, 155, Queen's-road, Bayswater, W. [ADVT.

WHITLAND ABBEY GREEN SLATES.

These SLATES are of a grey-green tint, are stout, and made in all sizes. A large stock available for immediate delivery. For further particulars (with a list of important buildings covered) apply to the MANAGER, Clynderwen, R.S.O., Carmarthenshire.—[ADVT.]

Helliwell's Patent System.

Of AIR and WATER-TIGHT GLAZING, WITHOUT PUTTY, and without exposing any outside woodwork to paint, and NEW SYSTEM of COVERING ROOFS.

The fasteners are brass or copper. The peculiar arrangement of the glass covers the whole of the woodwork, and only the small fastener is visible; herefore the roof is indestructible, and outside painting unnecessary. The squares of glass can be easily removed, and the whole taken out and cleaned by any inexperienced person. Breakage is impossible except through carelessness or accident.

The glazing is more air-tight than the old putty system, yet any amount of ventilation can be given.

Old roofs may be re-glazed on this principle, and roofs are covered with slates or zinc on this system.

Extract from BUILDING NEWS: "Mr. T.W. Helliwell, of Brighouse, has recently patented and introduced a new system of glazing and covering roofs, which is certainly superior to anything of the kind we have seen before . . . . and it will, in our opinion, supersede any other system before the public."

Important references and all particulars from the patentee, T. W. HELLIWELL, Brighouse, Yorkshire; and 19, Parliament-street, London.—[ADVT.]

Trade News.

WAGES MOVEMENT.

PENRITH.—Last week the operative stonemasons in Penrith connected with the union struck against the employment of non-society hands by the several employers. The unionists are still idle.

SOUTH SHIELDS.—On Friday night a general meeting of the operative joiners and house carpenters was held, to consider the masters' demands for a reduction of 1d. per hour in the wages. The meeting was very largely attended; and after a full discussion it was unanimously resolved to adhere to the former decision to withstand the reduction. The men, therefore, remain out on strike.

HIGH-CLASS VARNISHES.

READE BROTHERS, Tower Varnish Works, Wolverhampton, respectfully invite attention to their Varnishes for House Painters, Decorators, and Builders, which will be found of uniform excellence, and for elasticity, lustre, and durability all that can be desired. They would direct special attention to their Extra Hard-Drying Varnishes for church seats, and seats of schools and public buildings, which for hard-drying, brilliancy, and wear are unsurpassed.

TENDERS.

ASCOT.—For villas Nos. 1 and 2, to be erected at Ascot for the Ascot, Sunninghill, and General Land Co., Limited. Mr. John Norton, architect:—

	Villa No. 1.	Villa No. 2.	Nos. 1 and 2 together.
Pink, T.	£2,499	£3,790	£6,220 0 0
Colls	2,224	—	—
Boyce, Thos.	2,196	3,694	5,850 0 0
Lawrance	2,000	3,700	5,709 0 0
Braid and Co. (acc.)...	1,990	3,600	5,310 10 0

BAKEWELL.—For the placing and laying of pipes in connection with Sheldon waterworks, for the Rural Sanitary Authority of Bakewell:—
Littlewood, H. (accepted).

BRIXTON.—For alterations at the Brandon Arms for Mr. F. Gamer. Mr. Edward Brown, architect, Church-street, Spitalfields:—
Melver £463
Kiddle and Son 315
Marr (accepted) 309
Palmer 295

CANTERBURY.—For painting and repairs to the roof of the Corn Exchange for the Canterbury local board:—
Hills, H. £92 15
Cozens, J. F. 89 0
Gaskins, J. C. (accepted) 85 0
Surveyor's estimate 90 0

CAVERSHAM.—For new tower, south aisle, and porch, being the first portion of the enlargement and restoration of the parish church at Caversham, Oxon. Messrs. Morris and Stallwood, architects, Reading:—
Wheeler Bros. and A. W. Dodd (accepted) £2,351

CITY.—For repairs at The Red Lion, Basinghall-street, for Mr. Bargoyne. Mr. Edward Brown, surveyor:—
Marr (accepted).

CLAPHAM.—For stabling, billiard-room, &c., Shirley Lodge, Clapham-park, for Mr. C. S. Whitburn. Mr. E. D. Mathews, architect; quantities by Mr. R. C. Gleed:—
Loat and Co. £1,040
Battley 979
Downs and Co. 960
Newstead, N. 950

CLAY CROSS.—For the drainage of Clay-lane, Waterloo-street:—
Beard, H., Sheepbridge £195 0 0
Spencer, W., Danesmoor 89 9 0
Clark, Wm., Clay Cross 70 0 0
Holmes, Jos., Danesmoor 55 0 0
Clark, Jos., Clay Cross 53 7 6
Marshall and Byard, Clay Cross (acc.) 50 0 0

DEANWOOD.—For alterations and additions at Deanwood, near Newbury, Berks. Messrs. Morris and Stallwood, architects, Reading:—
Hopson (accepted) £1,022 5 0

CHAPPUIS' PATENTS
FOR
REFLECTING LIGHT.—DAYLIGHT REFLECTORS
OF EVERY DESCRIPTION, ALSO
ARTIFICIAL LIGHT REFLECTORS.
P. E. CHAPPUIS, Patentee. Factory, 69, Fleet-street, London, E.C.
N.B.—DIAGRAMS AND PROSPECTUSES ON APPLICATION.

THE BUILDING NEWS.

LONDON, FRIDAY, SEPTEMBER 20, 1878.

SPECULATIVE HOUSE MANUFACTURE.

THE architect is, in some degree at least, to blame for the distrust with which the public and the complaining householder regard him. He is now acknowledged, even by his own friends, to be in certain cases the last person whom the ordinary house-builder thinks of consulting about an ordinary "desirable residence." Yet the recurring evils of bad drainage, worse ventilation, and dishonest building are unanimously placed to the credit of the architect by the public, especially by that class of it which associate worthlessness in construction with external show or display. It is hard to convince some of these good people that the two things are not necessarily identical in the face of such overwhelming evidence, apparently, to the contrary, to be found in every street and suburb. Whenever we inquire into the complaints preferred by indignant clients against their architects, where professional men have really been employed, the burden of them are "extras" on the contract, and defective planning or bad construction. It is an excess of cost, inconvenient access to dining-room or kitchen, the improper positions of doors, deficient lighting, and unnecessary corridors. The servants complain of the badly-drawing chimneys, the ill-shutting doors, imperfect fastenings, mater-familias of the scanty closets, and the visitors of unpleasant odours or gloominess, and there is a general acknowledgment that external appearance and ornamentation have been attended to at the cost of convenience and comfort. We heard only the other day of a case in which a gentleman had spent upwards of £10,000 on a house designed by a well-known London architect, who had to call in a local builder to remodel the interior arrangements. But such cases are not uncommon, and we hear of them more generally in the country than in London, where badly-planned houses are readily bought or let in obedience to the great demand, notwithstanding the heavy risks incurred by the purchaser or lessee, who is occasionally liable for extensive repairs. Leasehold houses are always subject to this uncertainty, that the tenant is called upon to rebuild or structurally repair the premises at the close of his lease, the freeholder reaping all the benefit. We are ready to admit that no architect can be expected to please everybody's ideas upon house-planning, or his crotchets in matters of domestic convenience. He is sometimes hampered, sometimes compelled to plan a house to suit one tenant which will not please another; but the truth still remains that the house-planner and the architect are, from a cause not difficult to trace, frequently at variance. In glancing over the illustrations which appear in our own pages, we have abundant evidence of the truth of this fact, and the additional witness borne by competition designs leaves no doubt that an excellent design may have an execrably bad plan. We believe ourselves that much of this admitted failure is due to haste in the erection of buildings, and is attributable to the person who employs an architect. Undue pressure is put upon the architect to have the building commenced immediately, and the consequence is that little thought is bestowed in perfecting the plan. A still more prolific cause of bad planning is the too frequent practice of drawing elevations to suit some preconceived idea of the designer, and disposing the rooms accordingly. This is undoubtedly the course pursued by a large number of architects by whom a plan is looked upon as a very mechanical and subordinate part of the task confided to them, and as a thing that may be arranged upon the first crude idea that presents itself. Happily for architecture, our most successful practitioners have set an example in this respect, and have shown that the external design should be the outcome of the internal parts. But the most successful practitioner does not, as a rule, build the small leasehold dwelling-houses of our towns. They are the work of speculative builders, who employ architects to give them a design, the result of which is a kind of wholesale house-manufacture in the place of honest house-building. Here we have the undoubted origin of the grievance of which the public complain. The houses are built to let, not to live in—just in the same manner as many of the large upholsterers and tailoring establishments display goods for sale and not for wear. As long as a great demand for houses exists, it is probable that the public will continue to complain, and with justice, of the "knocked-up" houses in our midst, and architects will continue to supply inferior designs, to the detriment of their profession in the eyes of the public. At any rate, there is some justice, we fear, in the oft-repeated charge brought against the profession, that it is one that does not look after necessaries, that it sacrifices economy and domestic convenience to fashion, and that it is only one of the many whims the rich man can gratify, and the poor must be content to do without. We have lately had dinned into our ears from another quarter the strange doctrine that the engineer rather than the architect should be called in to restore or rebuild our dilapidated church fabrics—a doctrine which points to the same disbelief in the rational exercise of the architect's functions. In the latter instance there is an absurd jumbling together of the work of the two professions. The engineer's labour is purely mechanical in its nature, while the architect's cannot be estimated as so much material or labour for a given amount of outlay.

In a letter to a contemporary Mr. Marnock takes up the case of "dishonest houses," and we think fairly imputes blame, not to the architect—whom, he says, ironically, is the last person anybody would think of consulting in the construction of the ordinary desirable residence—but apportions it between the builder and the public. Now, the fact is, the public are chiefly to blame for the existence of dishonest houses. Despite their protestations of the appreciation of the value of honest practical building, they prefer the house of the same size that is more showy in appearance, so that their pitiful complaints about the desirability of the essentially utilitarian and sound are often mere empty moralisings, without any practical basis or result. The truth is, the purchaser or tenant of a house tries to obtain, if he can, both appearance and wear, without for a moment reflecting he is misleading himself in expecting to get both at a cheap rate. He is doing what the majority of purchasers do in trying to get a bargain, when experience should convince him that such purchasers invariably become the victims of dishonest vendors. As Mr. Marnock says, "a middle-class house, which ought, if well built, to be worth £1,300, is built and sold by a speculator for £1,000, or even less, and the householder soon pays a larger sum in yearly repairs than the difference in the cost between the two houses, and with the vexation of living in an unsatisfactory house the whole time." After all the whole question resolves itself into one of supply and demand. As long as purchasers and tenants prefer appearance to substantial plainness, and to live in houses of mimic grandeur rather than in comfort, a large market will be open for such dwellings. Architects will be found to design them, people to live in them, and the public to grumble at them.

It is scarcely fair, however, to blame the architect for the ordinary middle-class houses. In the majority of instances no architect has been consulted; the speculating builder supplies his own plans, gratifies the taste of vain householders, and disposes of his labour as fast as he builds at the highest profit. No one is to blame but the occupier for preferring one of these new-fangled residences to a house of mature age, well seasoned, and which has stood the wind and weather for fifty years or more. But the architects are still blamed. They are supposed to have countenanced style in house-building—Gothicism, in the shape of Lancet and Tudor-shaped windows, Classicism in heavily-dressed windows, sham pediments, and Queen Anneism, in the form of small window panes, and sundry other crotchets of a past age. The speculating builder must be *au courant*, and architectural dwellings are built without an architect. The only check that we can see for this state of things is the restrictive power of building regulations to compel a rigid performance of necessaries, and a certificate from a local authority certifying that the house is in a habitable condition, well-drained, and substantially built. The question is becoming more serious every day from whichever side we look at it. What are people to do for houses in London when these dishonest dwellings shall have shown signs of speedy decay or dissolution? Can we imagine even one-half the houses now building in our suburbs will be fit to live in in twenty—aye, ten years hence? There is even a greater impending grievance to consider—namely, the liability of leaseholders under grasping landlords, and it is a serious matter when, at the end of a fourteen or twenty-one years' lease, a tenant can be called upon, from some information lodged at the local authority as to the insecurity of his house, to rectify if not rebuild. We have heard of many cases lately where the uncertain and unsatisfactory state of the law has been construed in favour of the startling theory that a leaseholder, by covenanting to uphold and repair, makes himself liable to the lessor, at the end of the lease, to rebuild a better house than he has tenanted.

THE LOAN COLLECTION OF ANTIQUITIES AND FINE ARTS AT THE PARIS EXHIBITION.—IV.

NO part of the arts of the 16th and 17th centuries is better exemplified than the pottery. After the early Hispano-Moresque, of which there are many brilliant specimens, there is a continuous series to the middle of the 18th century. M. Alphonse de Rothschild possesses some of the finest. His collection is simply magnificent, containing grand examples of the wares of Gubbio, Urbino, &c. Many pieces are signed by Maestro Giorgio, Horatio Fontana, Fra Zanto de Rovigo and others, as are also some belonging to MM. Barons F. and R. Seillière. One grand vase, or cistern, of engraved faïence, richly coloured and glazed, bears the name of Horatio Fontana. There are two or three other pieces of this very rare and artistic pottery in the rooms. M. Fau also exhibits some splendid pieces of Majolica, especially of the various lustres. His Venetian glass is especially good. One large bowl is ornamented with the dance of Cupids designed by Raphael, which was engraved by Marc Antonio, and copied in a hundred ways all over Europe. There is a similar bowl, with Cupids playing on instruments, in the case belonging to Baron Stein. Out of the 37 pieces or so of

the delicate Henri II. ware which are known to be still extant, no less than 14 pieces are shown. Nine of the finest known examples are the property of MM. Alphonse and Gust. Rothschild. They are two fine candlesticks, similar to that in South Kensington Museum, two salt-cellars, two great tazzas and covers, two beautiful ewers, and one flagon and cover, in shape like the ordinary Dutch flagon, made of latten, pewter, or brown stone, which we see in the pictures of the Dutch school. We do not remember another instance of this form in Henri II. ware. Most of the pieces, as usual, bear the crescent and monogram of Diana of Poictiers or of Henry himself. Every description of the pottery of Bernard Palissy is here represented by choice examples. The finest are in the glass cases along the wall of the eighth room. Some beautiful salt-cellars, with elegant figures at the bottom of the bowls, will strike the eye. There are the usual representations of fresh-water fish and shells of the Seine; many dishes, with finely modelled figure subjects; and many pieces delightfully ornamented with arabesque designs, beautifully pierced and moulded, giving a larger scope for the exhibition of the artist's wonderful power of using rich colour and glaze. Some of the Rouen and other French earthenware is well worth examining. Their imitation of the richest description of Oriental china is the most satisfactory. In other descriptions of faïence they never equalled the Italian craftsmen. We have not space fully to describe the later pottery, chiefly porcelain, with which the lower rooms are filled—suffice it to say that there is a very choice collection of Dresden snuff-boxes, and of Chelsea and Dresden scent-bottles and bijouterie. There is also a fair share of Sèvres china, though few very important things. Among the Sèvres, and probably put there by Mr. Davis as a challenge, we have a remarkable set of three vases, made at Chelsea about the middle of the last century, in a most unusual colour—a sort of mulberry, something between the rose du Barry and the bright claret for which the Chelsea manufactory was so celebrated. The subjects are pastoral scenes after Watteau. We have seldom seen any Chelsea vases more interesting in every way, though of course they will not compare in importance with the celebrated Foundling vase and its companion. Mr. Davis also shows a fine lyre clock of plue de roi Sèrves china, with fine gilt mounts of the time of Louis XVI.

The collection of armour is both extensive and choice. The number of early swords is very remarkable.

Some very valuable Merovingian arms are exhibited by the Museum of Troyes, mostly discovered at Tournay, in the tomb of Childéric. All the early work in the fourth room is full of interest. There is the sword of Theodoric, with solid gold hilt inlaid with flat pieces of stone. Several gold brooches and fibulæ similarly ornamented, and another sword of about the same date and style of execution. Near them is a fine conical casque of steel decorated with gold, belonging to the Museum of Grenoble, found on the battle-field of Véseronce, where a battle was fought in the year 524 between the sons of Clovis and the King of Burgundy. Room 9 is entirely devoted to M. F. Spitzler's remarkable collection of arms and armour, which is fully worthy of the great archæologist, Louis Caraud, superintendent of Prince Soltikoff's collection, by whose efforts and judgment they were chiefly brought together. It contains some 400 pieces—many of the very highest rarity. Among the perfect suits, probably the most uncommon are those in the sixth glass case of the fourteenth and fifteenth century, very plain, heavy, and finely made, apparently complete. One splendid and richly-ornamented suit was made for Maximilian I., who succeeded his father as Emperor of Germany, in 1493. He is represented in a picture at Nuremberg wearing this very suit. Many other pieces are well worth observation, particularly some jousting armour. In case three stand two of the finest complete suits in the place, not easily to be surpassed in the greatest public collections. Both are splendidly etched and gilt. One which formed part of the fine armour belonging to the champion of England is believed to have been once the property of the Earl of Essex, the favourite of Queen Elizabeth. In the bandwork arabesques that run down the centre of the breastplate, his initial E., surmounted by by the Crown of England in reversed pairs, is eaten in with the aquafortis. If it were not for the tradition handed down in the Dymock family, the crowned E. would rather suggest a presentation suit to Edward VI. There is also a fine black suit with bands of gold, and a very rare and fair specimen of gilted armour. Case No. 1 contains detached pieces of one of those marvels of ironwork that were produced in the sixteenth century. They are of the age of Francis I., with subjects repoussée and damascened in gold, and in finest state of preservation. Some of the best damascening is to be seen upon the many exquisite guns and halberds in different parts of this and other rooms. Cases 9 and 10 contain lovely specimens, and the gun-stocks are in their way as finely decorated as the finely-chiselled and gilt barrels, being cunningly inlaid with ivory and various metals. Case 11 contains some remarkable gems—among them a grand iron shield with allegorical designs of Victory and Justice, and their opposites, beaten out, chiselled, and chased, little inferior to those in the Louvre, and three superlatively beautiful halberds of the time of Francis I., Louis XIII., and Louis XIV. respectively. Of armour embossed with subjects there is nothing better than what is enclosed in the twelfth case. There are in all seven pieces, all covered with battle scenes in repoussée. It is curious that so little is known of the great artists who designed and executed the many famous iron pictures of the beginning of the sixteenth century. If they had followed the far easier art of painting we should, in all probability, have known all about them. We noticed in one case a remarkably valuable English book of drawings of armour, opened at the picture of a suit, belonging to the "Earle of Pembroucke," all the pieces being given separately. In room 10 there are many Eastern arms of the highest quality. Especially worthy of note are some jewelled maces solidly damascened, mounted in jade, and inlaid with precious stones. As far as purity of taste and skill in conventional pattern designing is concerned, as well as in skilfulness of gold plating and damascening, hardly any European metal work can compare with these. We must not omit to mention the interesting armour in room 13, collected by Mr. W. Riggs. Here we have a brigandine of very curious manufacture, once worn by Amadeus VI., Count of Savoy — Scotch and English bucklers—many fine swords and helmets, some with curious inscriptions and beautiful ornamentation, and bearing the arms of the De Medicis and other celebrated people. One of the repoussée helmets is said to have belonged to Louis XIII. There are some good Italian pieces in this collection. No branch of ornamental art is richer or more instructive than that of ironwork where carried out honestly, as it was till the eighteenth century. The labour required was so great, and discomforts and difficulties so many, that few would have undertaken such uncomfortable work except they were manly fellows, loving their art for its own sake, and, consequently, few have even left a name behind though rivalling any other artist in power, skill, and taste. The amount of labour and pains bestowed upon the keys and locks alone, and the success with which the stubborn metal was forced to express the very feelings and sentiments of the ironworker, is hardly credible. Almost the finest work in hammered iron is a lock in the form of a triptych. The subject, knocked out in full relief of solid metal, is the Last Judgment: above, the Saviour is seated in majesty with St. Mary and St. John Baptist on either side beneath; to his right stands St. Peter with his key; on the left the devil, who is digging down a bishop, in company with monks and others, into the flames; at the bottom is the usual representation of the jaws of hell, with the souls escaping from it. The various expressions of the different faces are admirable, and considering the stubbornness of the material, it is hard to imagine how such vivid character could be introduced into the features of the principal figures. It is fortunate indeed that age has done nothing to injure this valuable relic; time is now and then very kind in cases where one would least expect it. Who, for instance, would have thought it possible that a bird-cage of exquisitely wrought iron of the 13th or early 14th century would have come down nearly intact to the present day? But so it is. It is to be seen in the fourth room. The workmanship is perfect, as delicate as Indian filagree, the design resembling the fine hinges on the church doors of the time. It comes from the Lyons Museum. On passing out visitors should examine the curious collection of musical instruments, and the original manuscripts of many of the great composers, from the library of the Opera: a piece of "Don Giovanni," a concerto of J. Sebastian Bach, besides the autographs of Gluck, Cherubini, Sully, &c. Great credit is due to those who caused so splendid an assemblage of artistic, valuable, and interesting articles to be brought together. It will be a matter of lasting regret that the instruction derivable from it should have been so much diminished by the want of a catalogue and fair description of the objects. We cannot have a better instance of this than the probably unique gold ornament, sent by M. Edmund de Rothschild after the Exhibition was opened. This, representing "A Goddess standing upon an Altar between two Dragons," is placed in a case full of pottery without a note to say what it is or whence it came. When we first saw it it did not even say who it belonged to. Those who remember the careful catalogue of the English Loan Exhibition of 1862 know how immeasurably the value of bringing together the Trocadéro Loan Collection would have been increased if this trouble, which would almost without doubt have been profitable commercially, had been undertaken. Still, so many of the things speak for themselves in their beauty that we leave the subject with thankfulness to those who have given us the pleasure and privilege of seeing these priceless collections.

MODERN ARCHITECTURE NEAR CHARING-CROSS.

THERE is one part of London in which the march of improvement has been remarkably rapid—so rapid, indeed, that the visitor who only occasionally comes to the capital, opens his eyes at the progress made. We refer to that portion of the Embankment and its tributaries, between Charing-cross and Blackfriars. The changes made have an especial interest to the architect, who is speculating upon the probability of being able to exhibit his skill upon a site that, at least, has the great advantage of being free from buildings in front,

and of commanding extensive views on both sides. There has been an undoubted opportunity for the display of architectural skill, and the partisans of opposite styles have already set their hearts if not their marks upon the splendid promenade facing the Thames. To the architectural critic also the diversity of style observed is not without its lessons, for we have the somewhat remarkable fact that a trial here has been made of every modern phase of style, from Late Gothic and "Queen Anne" to the revived Renaissance. One question with a great many is, which style wears the best in the smoky atmosphere of the Thames? There is some reason to fear that the very elaborate and costly façade of the School Board offices has already seen its freshest days, and that the superficial treatment of "Queen Anne" is a failure. Without any play of light and shade produced by prominent breaks and a broken plan-line, there is an air of monotonous colour in the fast-darkening front, while the Temple Chambers building a little southward of it seem to bid for notice as the next attractive architectural experiment along the Thames Embankment. Here stone is used, and the style chosen by the architects, Messrs. St. Aubyn and E. M. Barry, is a picturesque Renaissance of château character. The corner towers, the bay windows, the variety of frontage, the steep roof and dormers, promise to form a very pleasing group of parts, though we could have wished a little less detail and more breadth had been given to the work. Here and there—as in the window pilasters, and moulded cornices and bands—a finical appearance, rather detrimental to the general conception, is evident. The design is not ill adapted to the site, and with the gabled Temple Library, in Late Gothic dress, the old hall and masses of brick building in the immediate neighbourhood, the *tout ensemble* is not without effect.

But we may more especially mention the architectural improvements nearer Charing-cross. At the corner of Northumberland-avenue the Grand Hotel is making progress, and its main architectural interest is, we think, the adoption on so large a scale of a circular corner. Corner blocks do not, generally speaking, produce the happiest effect, especially when the corner is not rectangular, as in the present case; but an acute-angled corner is of all things probably one of the most difficult to treat satisfactorily. One mode of treatment is that of breaking the curve up into a number of vertical bays, each of which approximates nearly to a flat front; another is to treat it as a loggia, or to screen the circular front with a colonnade. The site at the corner of the Strand and Northumberland-avenue offered an unusual opportunity for an ingenious solution of this somewhat perplexing problem, and we await with interest the result. The frontage of the hotel on the ground floor is divided by flanged stanchions into bays of about 12ft., and these support plate girders, upon which the cornice and main fronts will rest. From the amount of work performed we cannot judge with any exactness of the effect of the rounded portion of the façade, though, if we may hazard the opinion, there is a want of scale—or, let us say, proportion—in the windows and the orders that almost incline us to the idea—we hope a mistaken one—that we are to have here a piled-up palace of stories in the hotel fashion, with no attempt to break the façade in any other way than by strips of pilasters between the windows. At the ends, it is true, we find corbelled windows of a flat-curved form that gratefully break the lines, and we hope the architects will spare us the distracting Manchester warehouse-like succession of bays noticed in the adjacent large hotel. In a warehouse we can tolerate a repetition of similar parts. We, in fact, look upon a warehouse as the embodiment of mechanical extension. But in a hotel made up of dissimilar elements, we expect the architect to dispose of them with the least amount of repetition. The staircases can be made external features to break the monotony of the windows, the façades can be broken into recessed and projecting parts, and the ordonnances can be varied by open loggias and screens. The French are masters undoubtedly of the art of giving variety to a façade, and a recession in the line of frontage of a long façade is often managed with considerable effect. At present the lower entablature looks rather crushing, but this effect will be taken off when the dark granite pilasters are fixed. The varying levels of the two fronts combine also to produce a disproportionately unequal effect to the Strand façade, where the ground is considerably higher, and the pilasters will in consequence appear shorter. Messrs. Francis and Saunders are the architects, and Messrs. Merritt and Ashby, of London-wall, are the builders. A little further down Northumberland-avenue, on the right side, the Society for Promoting Christian Knowledge are building extensive premises, W. Cubitt and Co. being the contractors, and Mr. Gibson the architect. The same peculiarity of a corner building is to be noticed, though the return street is at right angles for some distance, when it bends a little. In this instance the angle is broken back a trifle, and is divided by an engaged order into three bays, in the centre of which is the entrance. The wings, or return fronts, are relieved by two projecting bays of orders, Doric below and Corinthian above, with square end centre. The main order comprises two stories of two-light windows, and these are varied in the columnar bays by having complete ordonnances. The main cornice will be surmounted by an attic story, in which the intercolumnar spaces will be arched. Looking at the general effect of the design, we observe a tolerable subordination in the detail and recessed walls; the lower order is rusticated by horizontal channels, and the main order gives a boldness to the elevation. One feature we take an exception to, and that is the lower cushion frieze and guilloche ornament upon it, which appears quite out of keeping with the solidity of Doric. The lines of the adjacent building in the return street certainly do not continue the main horizontal divisions. This is rather a pity. The fronts are executed in stone, and the building will become a conspicuous feature in the new thoroughfare. By the way, we notice four triangular plots of vacant ground are still to be let in the Avenue, by the Metropolitan Board of Works, on leases of eighty years. On the east side the plots are narrow, and have acute angles—in fact, the angularities of the site impose no small difficulty in the way of an architectural occupation of this land. Excellent in position, the land suffers much on this account, and we cannot wonder at the sites remaining so long in the market. The awkwardness of corner plots of this shape seems to be a difficulty that calls for skill on the part of the architect at the present juncture, for the recent alterations to the thoroughfares of London, in cutting through dense blocks more convenient and direct routes, have necessitated the formation of several triangular plots. In the new streets contemplated from St. Martin's Church to Oxford-street, and from Covent-garden to Piccadilly-circus, many blocks of this form will be left, and will require all the tact and art the architect can bring to bear on them. It is to be lamented, however, that two of the leading thoroughfares destined to display our best modern architecture should have spaces for building, either very limited in depth or cut to such awkward shapes that economical considerations must very unpleasantly interfere with a due regard for artistic effect.

SUBURBAN BRISTOL.

"CAER ODER," "Bristow"—now Bristol ("The City of the Gap")—is situated, as most of our readers know, between the counties of Gloucester and Somerset, being a county in itself. It is bounded on the north and west by high ground, more or less precipitous, and lies in the valley of the Avon, which river takes an irregular course in a north-easterly direction to a point about seven miles distant, where it joins the mouth of the Severn. From its southern limits the ground rises more gradually towards Dundry; the valley expands into more level country on the east side.

One great source of the attractiveness of this neighbourhood is to be found in the extent and almost unlimited variety of its views, embracing the hill country many miles away. Brandon Hill and the Royal Fort are both important vantage-grounds. The former—dedicated by Good Queen Bess, of pious memory, "to the ugly maidens of Bristol to dry their clothes on"—rises rapidly from a very low level to a height of 250ft. from the sea. As Queen Elizabeth's directions have been loyally adhered to, it continues to this day free and unappropriated, except by those of the fair sex who seem meekly to have accepted her Majesty's ill compliment by using it for the purpose she named. The site of the Royal Fort is occupied by a house and grounds of early Georgian date, the home for many years past of the Tyndalls, formerly bankers in the city, and descendants of Tyndale, translator of the Bible. The house stands on the highest part of a park which was in past times of considerable extent; much of the ground is now occupied by buildings, to some of which we shall have occasion to refer.

As natural scenery is greatly dependent for its character upon the physical condition of the country, so we find that the neighbourhood of Bristol owes its attractiveness in a great measure to its geological position. It stands on rock belonging to the carboniferous system, in connection generally with which evidences of great changes, more or less gradual and disturbing in their nature, are to be found. Clifton Down and Leigh Woods stand chiefly upon that division of the system termed "the mountain limestone." This is generally found, as in the present instance, co-existent with luxuriant vegetation. The successive cropping up of the different strata belonging to this system, within the compass of a few miles, makes much which is commercially useful easily available, and good and varied building stone is therefore abundant. Our experience is that, in most of the new work near Bristol, the opportunity which this affords has either been lost sight of altogether or used with apparently little or no care for the judicious application of the materials. The warm red-brown tiles of old Bristol blend harmoniously with the landscape, and help to compose a more agreeable picture than the cold blue slate and limestone, so generally combined, ever could do under the same conditions. We take, for example, the Pembroke-road, the old "Gallows-acre-lane," which, for any attractiveness it may have, is certainly not indebted to the formal-looking villas which line it on either side. Its merits, which are but very comparative, are due to well-kept gardens, variations of level, glimpses of fair landscape, and other accessories; but the houses are suggestive of the speculating builder's manipulating genius, aided probably by an "idea" from some handy man not very far from the

builder's office, which idea is repeated *ad libitum* and *ad nauseam*.

What we have said here may be urged with at least as good reason of much that within the past few years has been done in Stoke Bishop. Is it possible to say anything in praise of the row of huge, box-like, semi-detached villas in grey limestone and blue slate, with the usual "dressing" forming part of what is known as "Rockleaze," which faces one when crossing Durdham Down from the last-named road? They serve as an index of much that lies beyond—houses set down on the most charming sites, commanding views rarely, if ever, to be surpassed, but themselves blots on the landscape without one redeeming feature except such as the ivy and creeping plants, which do not belong to them, furnish. The exceptions to these are rare, and more seldom still do they attain to the opportunities which so lovely a situation offers. As showing the happy result to be obtained by a judicious introduction of colour, a house, built about the same time as those in "Rockleaze," and standing near them, deserves notice. It was designed by Mr. E. W. Godwin, who was then practising in Bristol. Though "severe" to a fault, it possesses qualities of picturesqueness and power of harmonising with its natural surroundings which others near altogether lack.

We are sorry that we cannot give unqualified praise to a house now just completed near the Stoke-road, belonging to Messrs. Stephens and Bastow, builders and contractors, of Bristol, of which Mr. Henry Shaw, of London, is the architect. The design errs in being too "picturesque." The excessive irregularity of the masonry, the crowding together of "features"—tall external red-brick chimney-shafts, which rise clear from the springing of a roof of moderate pitch and terminate in great swelling caps—the too lavish use of red weather tiles, and the general breaking up of the design in every direction, both in form and material, gives it a disquieting appearance and destroys all breadth. A house near the last, designed by Messrs. Ponton and Gough, of Bristol, is satisfactorily treated. The light brown stone, quarried on the site, blends well with the red tiles in the roof. The walls are relieved by two or three bands of Bath stone. The disposition of the whole is very successful and good. In the next house to this, by Mr. Colman, architect, the seeming effort to produce something striking has resulted in failure. Why the four-centred arch, masking the tower in the basement, should be succeeded on the next floor by an early decorated window, to be followed by a coupled lancet window, which serves to light the two floors above, it is difficult to say, unless it be upon the principle adopted in classic revival of presenting the "orders" in chronological succession. This and other inconsistencies, and the harsh mixture of colour in the different materials, combine to produce a result which is far from satisfactory.

In "Christ Church," which stands on the road between this point and the Down, of which Mr. Colman was the architect, and Messrs. Cowlin the builders, an attempt has been made to reconcile unlimited pretensions with limited means, with consequent failure. What the attenuated-looking tower and spire are for we cannot say, as a modest bell-turret would have answered any purpose for which these are likely to be required; or, premising that the nonconforming Christians of Sneyd Park were desirous not to be behind those attending the neighbouring church, the tower might have been dispensed with for a time and the money spent where it was sorely needed in giving more substantiality to other parts of the design. As it is, buttresses, which the character of the building seems to require, are nowhere to be seen, except at the porches, where the reason for their existence is not very evident; these are heavy-looking and extravagant in design. The small windows to the ambulatory are bad in form, and the extremely acute crowns of the clerestory windows come into disagreeable contact with the eaves gutter. The commonplace tracery—which, by the bye, we are told by one of the local papers, "is something after the style of Tintern Abbey"—becomes offensive when repeated without variation throughout the building. It is sufficient to look at the portions of the main gables above the roof to feel that the architect must indeed have been striving after more than the cost would permit.

A short distance from these last, on a road recently formed between Stoke House and the Down, is a house lately built for Mr. Hale by Mr. Davis, from the designs of Mr. W. W. Bethell, of London. The site is a most charming one. The building stands on a terrace formed at the top of ground gently sloping towards the west. The architect in this has shown some appreciation for the task assigned him, with a result harmonious and good. The walls and chimney-shafts are built in red brick; the two window-bays chiefly in freestone. Of these, that which seems to belong to the drawing-room and is continued to the room above, is deserving of notice; the surmounting gable in half-timber work appears, however, to want something more as a *raison d'être*—it is hardly pleasant to see it springing as it does from the level of the eaves' gutter with no break in the face of the wall. The roof is brought down to the exterior of the wall, and is covered with red tiles. An effectively-moulded brick corbel table is carried round below the eaves' gutter. In this case there is reason for the tall chimney-shafts, as, with a high-pitched roof, they are carried well in to the composition, and being well designed materially contribute to the success of a good sky-line, and are not, as in some cases, so suggestive of danger to the inmates. The barge boards, conservatory, and other exterior woodwork, are coloured in dark maroon. The terrace wall is an effective bit of panelled brickwork, with star-formed piercings. We shall await with some interest the completion of a house on an adjoining site for Mr. W. E. George, of Bristol, of which Mr. Bethell is also the architect. The stone being used is quarried from a bed of old red sandstone, on ground belonging to the proprietor in the vicinity. It is, as may be judged, hard and close-grained, and of a rich chocolate colour. Ham-hill stone, which is the same in colour, but more durable than Bath stone, is being used in the windows, &c. Messrs. Stephens and Bastow are the builders. "Ellenthorp," by Mr. Selby, of London, of which Mr. Diment was builder, is a house of somewhat less scale than the two last-named, but is an agreeable example of modern Tudor-Gothic. It is built with a light brown stone, and roofed with blue and dark brown tiles in broad bands. In Leigh Woods, or elsewhere, little evidence is yet given of a desire to do justice to the rare natural beauties of the place. The road from the bridge might fairly be termed one of lost opportunities. It is lined with villas of the true speculator type—rows of monotonous-looking houses, with scarcely a single point in them to admire. There is a mansion of some architectural pretensions overlooking the river, by Messrs. Fosters and Wood, built chiefly in red brick, with stonework in the details, which are somewhat Jacobean in character. As seen from the road skirting Nightingale Valley it groups very well, and composes charmingly with its surroundings. "Rosemont," by Messrs. Ponton and Gough, and "Springhill" and "Southfield," by Mr. Henry Shaw, stand at the junction of the Bridge road with the Leigh road. Of the first-named we are somewhat doubtful whether the contrast between the cold colour in the walls and the warm colour in the roof and chimney-stacks is not too marked, and whether the effect of building the chimneys partly or wholly in stone, and introducing a little red into the walls, would not have produced a better result. With this exception, however, the composition appears successful; there is an air of quiet repose about it, the plan is sufficiently broken, and the sky-line is good. The octagonal bay at one of the angles is an agreeable feature. Of the two others "Southfield" is, perhaps, the more satisfactory, but we see nothing to justify the excessive tallness of the chimney-shafts—they do not compose well with the comparatively low pitch of the roof, nor should we feel very confident of their power to resist a heavy gale. The lower portion of the walls is in the local grey limestone, with Bath stone strings, &c.; the upper part is half-timbered work. The timber framing has a somewhat bald and meagre look. In "Springhills" the result of using grey stone in the walls to the level of the ground-floor window-sills, red brick to the level of the first floor, succeeded by half-timbered work, is again a failure. Neither the limited size of the house nor the simplicity of the plan would seem to justify so much vertical cutting up. As seen from the back, the view is too "picturesque." Both houses are covered with red Bridgwater tiles. The new gateway and lodge to Ashton Park, by Messrs. Fosters and Wood, lately erected upon the Leigh road at this point, is a thoroughly successful bit of Late Gothic work. The stone used is grey limestone, with freestone in all the details. The gate is surmounted by a four-centred arch, with an oriel window over, and above that the arms of the Smyths. There is a canopied niche on either side of the oriel, containing a figure. The entrance is flanked by the gatehouse and towers. The removal of the upper portion of the wall at this point, and the substitution of iron railings, gives from the road a most charming view over the park. The villas in the road skirting Nightingale Valley scarcely call for mention. They are mostly in a doubtful Gothic style. "Glenside," perhaps, is the best. Mr. Fox's Swiss villa is picturesque, and suits the position. The red pointing in the walls of this and the last-named deserves notice as helping to relieve the coldness of colour in the grey limestone. Mr. Colman is engaged in the erection of two villas in this neighbourhood; they are nearly alike in design, but are not yet advanced enough to enable us to speak with much certainty as to their merits. Mr. Pugsley is the builder.

Mr. Hain is building two houses in the Bridge-road from drawings supplied by Mr. Eyland. They are composed of the generally accepted local materials, with but little departure from the ordinary type.

In Tyndall's Park, the Philosophical Institution has lately been extended by Mr. Colman in a manner utterly inconsistent with the style of the original design, and with a result which in no way warrants the departure. The earlier portion, the joint production of Messrs. Fosters and Wood and Ponton and Gough, though not what it will be when the intended carving in the caps and elsewhere is executed, is a by no means unpleasing design in Venetian-Gothic. The last of the nine arched bays on the side of the original building Mr. Colman has filled in with a three-light Early Decorated window, and possibly the rest of his work may be described as belonging to the same period. The general design of the addition, if judiciously treated in a pen-and-ink perspective drawing, might look tolerably well, but the reality is poor, and

the departure from the original design questionable in taste.

The British Grammar School, a new building in Tyndall's Park, with master's house, is now nearly complete, and is a very well-treated example of Late Domestic Gothic. The walls are built with a red-coloured stone found on the site. The traceried windows, quoins, and other details are in Bath stone. The roof of the great hall is open-timbered, of a trussed collar-beam form, with curved braces. The window tracery in the hall is very good in design; so are also the wings and flanking towers on either side of the main building. The house stands apart from the school. It is satisfactory to be able to feel that, where nature is so lovely, a group of buildings should increase, as this does, the attractiveness of the locality. The work, which is to cost £18,000, is being carried out by Messrs. Wilkins and Son, builders, under the superintendence of Messrs. Fosters and Wood, architects. The villas, which cover certain portions of the park, are mostly of a nondescript Classic type. They possess more variety and are somewhat better generally than those in the Pembroke-road. "Bannerleigh," "Gordon Lodge," and four others, forming a row of six, are agreeable, though commonplace in detail, as are also three others, of which "The Elms" is one. They are strictly "suburban" in character, and, although their places might be more worthily filled they do, perhaps, possess something a little beyond negative merit.

The churches of the past few years are, generally speaking, in a more or less incomplete state. The earliest in date—Mr. G. E. Street's fine church of All Saints, in the Pembroke-road—serves to show the wisdom of proceeding by stages. Little now is required to complete it but the tower and spire. The church of St. Mary the Virgin, in Tyndall's Park, by Mr. St. Aubyn, of London, and that of the Holy Nativity, at Totterdown, by Messrs. Ponton and Gough, are both in earlier periods of their development. The former at present consists of a chancel, transepts, and two bays of the nave and aisles, to which will be added, as funds allow, two bays, a western porch, and a north-western tower and spire. The latter is a brick building of Northern Italian type. It is at present complete only as respects the chancel and side chapels, with two bays of the nave and ambulatories. It will receive six additional bays and a high campanile. The baptistery at the west end of the nave is already built, and the nave is covered in for present use by a temporary building. The church promises, when finished throughout, to possess considerable merit. The detail already existing is very rich in form and material, and the general treatment presents much novelty of design. Mr. Bevan's Church of St. Nathaniel, Cotham, still wants its tower and spire to complete what is, generally speaking, a well-proportioned and effective building. The work of extension to the Clifton pro-cathedral, by Mr. Chas. Hansom, has as yet been only partially carried out. Mr. Hansom was lately successful in a limited competition for additions to Christ Church, Clifton. It was decided not to carry out the work as contemplated. He has, however, been entrusted with the heating and ventilation, lowering the present seats, and the decoration of the interior. Messrs. Lewis and Sons, of Clifton, have undertaken the work at an estimated cost of about £1,000. The church—built in 1841 from designs by Mr. Dyer, of Bristol—is a very good example of that early period of the Gothic revival. The tower and spire were subsequently added by Mr. John Norton, a Bristolian, now practising in London. The design is based on the Lancet period; the building is an ornament to the locality, and puts to shame many churches of more recent date. A new church, St. Peter's, Clifton-wood, is shortly to be commenced upon a site near to that of the present one. The architects engaged are Messrs. Voisey and Wills, of Bristol. Near to St. Nathaniel's Church, Cotham, is a Wesleyan chapel, now just completed, for which Mr. J. Curwen, jun., of Liverpool, was the architect, and Messrs. Stephens and Bastow, the builders. We are pleased to find in this, not a distorted aping of church design, but what is, to all intents and purposes, a chapel. The style is Early Geometric. The details are good. Internally deep galleries are carried round on three sides, supported by iron columns of good form. The roof is of a wide span, of a modified hammer-beam construction, boarded and panelled, and of elaborate design. The stone corbels upon which the wall pieces foot are somewhat needlessly large and heavy. In the two rows of arcading over the pulpit the superposing of ten bays to six is not a desirable arrangement. The seating is of good design, but the position of the boarding under the seats seems to afford scarcely room for the feet in kneeling. These are, however, minor matters which do not seriously affect what is, on the whole, a meritorious production.

Clifton has expanded very considerably during the past ten or fifteen years. The establishment of the college some time back gave an impetus to villa-building in its neighbourhood with a result which has left little or no room for further work of the kind. A glance at the parish church causes us to hope that at no very distant date Cliftonians may be induced to erect in its place a building more worthy of so charming a site. It would be difficult to conceive anything as a design more deplorably bad than the present church. Art life seems to be dull in this locality. There is a certain amount of fashionable dilettanteism, but patrons are tardy, and talent is latent.

R. F. H.

NOTES FROM EDINBURGH.

THE improvements in Princes-street, resulting from the acquisition of the gardens, and commenced two years ago, will likely be completed before winter, when this street will be the Broadway of Edinburgh—its widest as well as its longest thoroughfare. The pavement in front of the houses has been lifted, widened, and renewed, and the footpath opposite now runs within what was garden ground. An additional charm will be given to this popular thoroughfare by the rising spire of the cathedral, which ends the long vista of its perspective to the west, just as the Calton Hill and its monumental architecture closes up the eastern extremity.

The gardens themselves are of great advantage as a public park. The city has entered on possession of a property which has been carefully tended from the first, and laid out to the best advantage by the landscape gardener. The trees are healthy and of considerable growth, so that there is a fair share both of grassy lawn and grateful shade. No recreation is permitted inconsistent with the proper maintenance of garden ground. Except on Sundays, or when music draws a crowd to the spot, and even without restriction to the walks, the verdure of the grassy slopes does not seem to suffer, and through four dry summer months they have remained delightfully green, showing the same pleasant contrast as before between the dusty street and the dark-brown battlements of the castle and its rock. The gardens have been greatly improved as a promenade by the construction of a broad terrace-walk, at either extremity of which a very massive flight of steps now leads up to the thoroughfare above. Here, or on the higher footway of the street, the passengers can take shelter from the sultry heat of the pavement under what is nearly a continuous avenue of shade.

The carriage-way is being laid with the ne-plus-ultra of causeway in whinstone. A commission was appointed to inquire into the respective advantages of asphalte, wood, and stone, and the last has been adopted. The noiselessness of the wood is a great desideratum, but the specimen laid in Queensferry-street, where the traffic is great, is not in favour of its durability or cleanly appearance in wet weather. The causeway is laid on a bed of concrete about 1ft. thick. The tramway sleepers, which are in one piece of steel with the rails, and have suitable flanges, are now laid with the blockers on a thin bed of small whinstone, gravel, and cement, and, when a sufficient portion is done, the joints are grouted with cement, and the whole becomes a solid impenetrable mass. The durability and easiness of transit are both enhanced by the narrow width of the stones, which are 3in. across the face upon the surface. The *bête noire* of this perfect causeway is the necessary evil of having to provide for gas and water pipes. The expense of a subway is enormous, but where pipes run near the edge of the thoroughfare the causeway can be laid with sand instead of cement. The estimated cost of this work is £20,000.

The improvements will be complete when the garden footway has been paved. This is to be done with selenitic cement, at a cost of £5,000, and will be somewhat of a novelty as well as a very economical expedient. The pavements executed here in Portland cement have been such conspicuous failures that the small specimen of selenitic laid down in Princes-street looks as near perfection as anything can be. At present, indeed, both as to its comfort and appearance, it contrasts favourably with the best specimens of stone pavement, and is about a third of the cost. Excellent as it appears to be, however, it is not equal to the Val de Travers work, which has a degree of elasticity foreign to the character of the hard cement. Its durability also has been tested, while that of the selenitic may be said to be still under trial. The cost of selenitic and asphalte was estimated at £5,000 and £9,000 respectively.

The façade of the Royal Institution interferes much with the widening of the carriage-way and accommodation of the tramways, and several plans involving some curtailment of the architectural accessories of the edifice were suggested, but these have not been listened to.

Sculpture, as well as civic legislation, has been doing something for the embellishment of the city. The list of statues lately added is a large one. Since the Albert Memorial was unveiled, two years ago, four monuments of this kind have been placed, three of them in the Princes-street gardens. These are all considered to be happy likenesses of the originals. Sir Walter Scott has now Dr. Livingstone on his right and Adam Black on the left. Sir James Simpson is in the fashionable western extremity, and sits with benignant smile on the professional chair. Adam Black is represented standing clad in robe of office as Lord Provost, and with the aspect of the legislator. In the statue of Dr. Livingstone there is less of statuesque repose; he is the pioneer of civilisation, with girded loins, grasping energetically the Bible in one hand, while the other handles the axe, and there is a large collection of the instruments by help of which he forced his way into untrodden paths. The dignity of this monument is, however, much impaired by the minor scale of the casting, which ought to have been at least as large and massive as that of similar statues in the locality. The last of the four was recently placed in George-street, at its intersection with Castle-street, being that of Dr. Chalmers. The divine is represented standing on an obelisk, cut off a little above its base, and he is robed in the preacher's gown, with a large pulpit Bible open in his hand. Professor Blackie does not like the pedestal, which appears to be a novelty without any excellence as a pedestal to recommend it. It is not often that such monuments ignore the fact that the architectural importance of the pedestal increases with the distance. This pedestal, at a distance, has something of a shabby look beside others in the city. The *raison d'être* of this novelty probably lies in the economy of its design, or perhaps in the fact that Cleopatra's Needle was making a stir when it was wanted.

The premises of the Union Bank, in George-street, have been opened. People accustomed

to the palatial architecture of such institutions will be disappointed. The façade projects slightly, very much to the disadvantage of the aspect of the neighbouring tenements, and presents in its frontage of 100ft. three simple open Ionic porches and a monotonous range of windows of very commonplace Classical design, surmounted by a heavy cornice. The interior has no spacious hall or grand staircases, but contains some fine polished granite columns and an immensity of costly plaster work.

The spire of the cathedral has been finished to the level of the corbelling below the lines where the spire proper is commenced. The carving is nearly all completed. The vesica pisces, with the figure of our Lord enshrined, which adorns the east gable, has been surrounded with representatives of the angelic host in good relief. The five statues for the niches underneath are on the ground. The elaborate sculpture on the tympanum of the western doorway is not yet finished, but the shafts of polished Shap granite are fixed. The slating of the choir is done, and the vaulting of the interior and the transepts is in hand. Workmen are now laying the pavement of the nave floor, which is of a simple pattern of the ordinary polished flags, relieved by squares of red stone. The glazing is nearly complete, and the church is expected to be opened in October.

THE MOTION OF WATER IN OPEN CHANNELS.

It is now a fact pretty well established by actual observation that the greatest velocity of an open channel of water is not at the surface, but at some distance below. Hydraulic engineers have accounted for this fact in various ways, generally by the resistance of the air at the surface; but this theory does not hold good, for it is now found that even when the wind is blowing in the same direction as the current, the greatest velocity is still below. In a paper read by Mr. James B. Francis, C.E., and published in the American Society's transactions, some interesting experiments are recorded, made in the canals at Lowell, which prove that in a running stream of water of uniform section there is an intermingling of currents, or the water at the bottom comes to the surface at varying distances, depending upon the depth and evenness of bed. Thus, in a reach of canal 1,200ft. in length, of uniform section, 20ft. wide at bottom, 50ft. wide at the surface of water, and 10ft. deep, and with a velocity in the middle of canal at the surface of 3·4ft. per second, a bent tube was introduced at the up-stream end of stream, the lower orifice being turned in the direction of current, and kept about 5in. from the bottom of canal. The other end was connected to a tub containing whitewash, and a plug was inserted at the junction. At a given signal the plug was withdrawn and the whitewash discharged through the pipe. The water was nearly clear, and the banks were seen at a depth of 3ft. or 4ft. Eight trials were made, and in all the whitewash appeared at or near the surface at distances from the orifice of pipe varying from 100ft. to 175ft. Another series of experiments, made in the same year (1867) showed a similar result. The writer also recounts the means taken to measure the velocity of canals by tin-tubes, loaded at one end with lead, so as to sink nearly to the bottom. These tubes are put into the stream in a vertical position, and abandoned to the current, and the time of their passage between two given cross sections is noted. By this means have been ascertained, in particular portions of the width of flume or canal, the variations in the velocity of the water, the average of thirty such observations being about 3·12 per cent. Similar variations occur, it is thought, in the depth, the result of a similar cause—viz., the interchange in the position of the current, moving with different velocities. No correct data, however, have been discovered to place this hypothesis upon a sure basis, but it is obvious that the retarding action of the bottom of a channel must be great in the proportion of the shallowness of the stream. Thus, in a rectangular channel, of a depth less than half the width, the retardation must exceed that of the sides, and eddies and other irregular motions of the particles of water take place, causing the quick-moving currents to penetrate those moving slowly, and to detach masses of water from the slow currents and to force them farther from the sides. It has been proved, indeed, that the current of greatest velocity sways from side to side, rises and falls in curvilinear paths, or, as has been suggested, in cycloidal arcs. There is no doubt, we think, that a circular motion of the water is produced by the eddying caused by the retardation at the bottom and sides of a channel. This was shown by Professor Reynolds, at Manchester, and the phenomenon of moving water in channels is analogous, in our minds, to the passage of smoke through a flue or pipe where eddying and whirling motions are seen. This idea has been suggested, we see, by De Volsin Wood, in the discussion, and he hints, with much truth, that the complex motions of flowing streams baffle the mathematician in arriving at a constant mathematical law for all streams. Only close observations of many streams under varying conditions can ever give the practical hydraulician a basis for his operations in the case of open streams and large pipes. All that we can practically learn from the experiments detailed is, that the retarding action and obstructions to the passage of a stream of water produce countless deflections and reactions of the molecules, upward and sideward and downward, which act upon the main current of water, reducing its velocity in a sensible degree, and giving rise to those varying velocities found in all flowing bodies of water. The phenomena of the flow of fluids would, we believe, receive collateral light from observations made upon the current of air up flues and through apartments. When these matters are better understood we may hope to see the day when ventilation will be placed upon the footing of an exact science, and when the nostrums of ventilating companies and individuals will be estimated at their proper value.

AN ECCENTRIC COLLECTOR.

The contents of Dulford House, near Cullompton, Devonshire, have been sold by auction during the past week, the sale lasting six days. Messrs. Frost and Collings, of Teignmouth, were the auctioneers. The late owner was Mr. Bethell Walrond; his will was disputed on account of alleged insanity. This sale is the result of proceedings in the Probate Court. Dulford House is an intensely ugly mansion, built a hundred years since by the late Lord Monteith. The house and its thirty acres of ground are enclosed by a brick wall, 12ft. high, and upwards of a mile in circumference. Mr. Walrond's eccentricities were manifold and well known. He kept for a number of years the embalmed body of his daughter in his dressing-room, nor was she buried until after his death. He slept upon a massively carved old oak bedstead, and upon its footboard he had the skulls of five females, facing inwards, whilst above, at the four corners overhead, were waving hearse plumes. He believed in the transmigration of human souls into animals, and had a cemetery upon his grounds wherein the dogs were buried, and over whom headstones, giving the name, date of birth and death, &c., are erected. His collection of carved oak furniture—nearly all of it of a pronounced Devonshire type—was very extensive, and considerably over a hundred carved oak chests were knocked down by the hammer. Some of these were very handsome, and all fetched high prices. One bedstead went for 50 guineas, and an unfinished one, bearing the date of A.D. 1601 (antecedent to the reign of James I., it may be remembered), made £40; two small cases of seals, after a spirited competition with the British Museum's representative, was bought by Col. Ridgeway for 100 guineas; a bust of Napoleon, by Canova, was sold for £75 to Mr. Doddington, of Horsington House; and a large figure in Spanish chesnut, of the madonna and child, were bought for 18 guineas by Mr. Harry Hems, of Exeter, who was also a large purchaser of carved oakwork; 2 carved oak wardrobes went for £40 and £34 respectively; and one in walnut, of early Nuremburg work, was knocked down for £38 to Mr. Ship, of Bristol. A great deal of old Sèvres, Worcester, Bristol, and Oriental china were put up, and sold well. The pictures, however, had all been sold previously. A fine collection of armour, which originally cost the owner some £10,000, was also sold; it had suffered much from neglect, and its value, therefore, was much deteriorated. Four lay figures, clothed in ancient armour, went for 20, 16, 15, and 12 guineas, the best going to Mr. Brand, to whom also the best part of the beautiful old silver ware was knocked down. Six heaps of old armour fetched 23, 20, 17, 13, 11, and 8 guineas a heap, and four others 10 guineas each. Mr. Walrond owned quite an armament of artillery, and 50 cannon, from 18 pounders downwards, were offered for sale. The 18-pounders went for 3 guineas, and less, a couple; but 4 pair of bell-metal guns, weighing about 100lb. each, fetched 20 guineas per pair. The sale attracted much attention, and was well attended by a large assembly of dealers and art-collectors from London and all parts of the kingdom.

KERAMIC ART IN JAPAN.*

Part VI. of this work has reached us, and is equal in merit to its predecessors. The introductory essay on Japanese art is concluded. Japanese mythology forms the subject of some interesting observations. The authors say:—"We have not met with any attempts to depict the Creation in Japanese art, although we learn from Siebold that native artists have essayed the rather undefined and difficult task. From their point of view the Creation was confined to Japan, the original and great sun country. In a series of six drawings, given in Siebold's 'Japan,' the works of creation are thus set forth. The first is simply a white disc, which represents the beginning of all things; the globular mass of uncreated matter which, in the earliest epoch of time, consisted of the clear and the turbid in an undivided state. The second is a disc divided into two portions, the upper of which is white and the lower dark; this represents the result of primal motion, the separation of the solid from the gaseous, the creation of the heaven and the earth. The third displays the first effect of the consolidation of turbid matter, which, the Japanese state, was like mud covered with water and clouds. Out of the centre of this mud sprang a shoot, like that of a plant, which grew and transformed itself into a primal being, called *kuni-soko-tatsino-mikoto*. The fourth represents the epoch in which, on the complete division of solid, aqueous, and gaseous matter, *Panko*, or primitive man, is self-created, invested with godlike powers to promote the formation of the universe. The fifth represents the creation of the islands of Japan by the god *Iza-na-gi* and the goddess *Iza-na-mi*, the third and fourth created beings, who stand on the bridge of heaven and direct the work. The sixth shows the same deities creating living creatures." Reference is made to the seven deities or household gods of the Japanese, which are frequently depicted in works of art. Thus, in plate 50 are Hizen stoneware figures of the god Girogin, Hotei, and several others. These deities represent temporal gifts and personify ideas of earthly welfare and happiness, but are not worshipped. Long life, health, food, contentment, love, and glory are impersonated under the respective names of Girogin, Daikoku, Yebis, Hotei, Benzaiten, Bisjamon, &c. They are represented invested with characteristic attributes, and supply the quaint humour of the Japanese artist with a fund of choice imagery. Thus the god of long life is represented as a venerable figure sometimes, as in plate 51, "after a weary time of contemplation enjoying a magnificent yawn and expressive stretch of the limbs." Daikoku is shown as a short stout man, seated on bales of goods to represent honestly-acquired property, with a bag over his shoulder, the neck of which is tightly grasped to represent wealth difficult to attain and equally difficult to retain. A miner's hammer in the right hand indicates the hard labour by which alone the good things of life can be honestly obtained. The deity is shown in company with a rat, the embodiment of the destroyer of property, and as the Japanese idea of wealth is rice, the rat is certainly an appropriate emblem of depreciation. We pass on to notice the exquisite chromo-lithos of this part.

* Keramic Art of Japan. By Audsley and Bowes. London: Henry Sotheran and Co.

On one we have an unique collection of Hizen-ware basins. Those with faceted sides, decorated with floral and geometrical diapers, are exceedingly choice, but we can scarcely look at one that does not display some rich product of the artist's imagination, some chaste decoration in form or colour. The scalloped basins, quaintly decorated with medallions and diapers, and charmingly relieved by rich colouring, alone furnish a storehouse of suggestion for the decorative artist. Another plate shows a jar of deep-blue Hizen porcelain, decorated with sprays of white mume on a clouded blue ground. The square-shaped dish of late period and the circular dishes are most charmingly painted on blue, of great depth and richness. Of Satsuma faïence we have illustrations of two exceedingly original Koros, covered with a waxy glaze, and crackled. They are of buff *pâté*, the body of one being curiously ornamented with hexagonal and circular perforations, peculiarly disposed, resting on three heads, and having a cover surmounted by a Japanese lion. This is in the possession of James L. Bowes, Esq., and another, of singular delicacy and beauty of colouring, belongs to Major J. Walter. These chromos are certainly masterpieces of artistic delineation. A pair of vases of Kioto ware, showing the fronts of the pair, and the side view of one, are exquisite in the gilded ornamentation and colouring they display, no less than the beauty of the outlines. We hardly know which to admire the most, the skill of the Japanese artist who produced them or the exceeding delicacy and half tints of the reproduction in the plate. A singular example of a Kaga-ware basin, decorated entirely with zones of figures in deep red and gold, is certainly wonderfully rich in colour (see Plate XXXII.). The belt of outside figures forming the main zone of the basin shows a curious assemblage of differently-dressed and aged figures. Below this is a pleasing border of conventional leaves and fret in gold line work on red ground. Plate XXII. is devoted to some very interesting groups of Satsuma ware, a hard vellum-tinted *pâté* decorated in enamels of colour of floral and other designs, generally of refined tints. Plate L. represents some curious stoneware figures of household gods. The figures of Hotei and Daikoku are excellently rendered. The last two plates are in autotype. This part has been delayed owing to the numerous engagements of the chromo-lithographers, MM. Didot and Co. The next part will conclude this surperb work, in which seven chromos are promised, and we are sure the subscribers will have every reason to be satisfied with the fulfilment of the authors' programme.

TECHNICAL EDUCATION IN FRANCE.

IN his inaugural address, delivered at Paris, on Monday, Mr. E. Williams, of Middlesborough, the president of the Iron and Steel Institute, which is holding its congress in the French capital, contrasted at some length the English and French systems of technical education. He said public education in France was divided into five faculties — Literature, Law, Medicine, Theology, and Science. Foremost amongst the schools for technical education stood the Ecole Polytechnique, with its branches the Ecole des Mines and the Ecole des Ponts et Chaussées, destined exclusively for the education of Government, railway, and mining engineers, not to speak of the military and naval branch of the school. The admission to the Ecole Polytechnique was by competitive examination, and the degree of bachelor in science and literature was required for admission. This examination was a somewhat severe test of sound primary education, as it comprised the whole of arithmetic, elementary geometry, algebra, trigonometry, descriptive geometry, physics, and general chemistry, and a knowledge of German. From 120 to 150 were admitted per annum out of a number five times as great who presented themselves for examination. The pupils of the Ecole Polytechnique were boarded and lodged at the Government expense. The studies were purely scientific. They embraced the higher mathematics, mechanics, physics, chemistry, geometry, and astronomy, and there were some twenty or twenty-five places in the civil service set apart annually by the Government for the benefit of the first students, and thus was supplied with well-educated artillery and engineer officers. The students who passed sufficiently high could choose to pass into the Ecole des Pontes et Chaussées or the Ecole des Mines. In those the student engineers passed three years, with a State allowance of £72 a year, and the students travelled in France and abroad at the partial expense of the State. In a similar way the Ecole Centrale des Manufactures did its work for the technical education of Frenchmen. He did not advocate the establishment of an Ecole Polytechnique with its superior adjuncts in Great Britain, for the simple reason that England required no Government engineers to direct public works. The Ecole Centrale differed in its organization essentially from that of the Ecole Polytechnique, insomuch as it made no promise of employment to its students, depending for its success upon the amount and character of the technical education it might succeed in imparting to the majority of the students that passed from its walls into practical life, and it was this one which recommended itself more to Englishmen of independent action. The only establishment in Great Britain comparable with the Ecole Centrale as regarded metallurgy was the School of Mines, which, if it were installed in a capacious building, and had other branches of knowledge added to its curriculum, might easily, under the guidance of such men as Perry, Smyth, Frankland, and Huxley, be developed into an institution which would give rise to beneficial results difficult to over-estimate. There were several Ecoles Industrielles scattered all over France, and many of the leading works had schools connected with them. Creusot works had schools giving instruction to over six thousand children. The President concluded by observing that these intercommunications must lead ultimately, not only to the cheapening of the cost of production, but chiefly to the attainment of fresh starting-points in the application of iron and steel for the useful purposes of man.

THE ULVERSTON REVOLVING SHUTTERS.

THE old-fashioned lift-up shutter is rapidly being consigned to the limbo of the past, and revolving shutters are taking their place. One of the latest and cleverest improvements we have seen in revolving shutters has been introduced by Messrs. Salmon, Barnes, and Co., of Canal Head Foundry and Works, Ulverston, by which the shutter, made either of iron or wood, can be balanced in any position by counter-weights attached to a chain passing over the roller. But the most ingenious point in the contrivance, to our minds, is the adjustment of the axis of the roller to the weight of the shutter, by which the shutter is made to coil vertically, and all imperfection avoided. Thus a friction pulley at the back of the roller presses the chain as it winds on the pulley, moving the roller forward as the shutter descends, and backward as it rises; by this means the shutter always hangs vertically in the grooves, and the friction is reduced to a minimum. The weights are applied at each end, and the chain links are cut to the curve, thus easing the coiling action; while the chain itself is tapered to facilitate the motion and balance. The chain and weights can be carried to any distance behind the shutter shaft by the arrangement of pulleys, and this is an advantage the architect will esteem. Messrs. Salmon, Barnes, and Co. have also introduced a corrugated wooden shutter, in which each lath is formed of two convex members, and a sunk face between. These are made of varnished pine and bay wood, and are adapted for domestic windows, divisions of offices, &c. Copper and webbing bands connect the laths, and this material is found to be more durable than steel. The sections before us show a variety of section adapted to every style of building, and we have much confidence in recommending them to the profession. We have frequently complained of a hitch in the coiling up of revolving shutters; another drawback is the unpleasant noise of winding up or letting down—two objections, we think, Messrs. Salmon and Barnes have ingeniously obviated in their improved manufacture. We understand they have received the highest award at the Paris Exhibition for iron and wood revolving shutters worked by patent balance-weight motion. They have also been awarded honourable mention for their patent Roanhead rock drills, exhibited in Class 50.

THE SEVERN BRIDGE.

THE cylinders for the last pier of the Severn Bridge were founded a few days ago, and thus terminates one of the most important works connected with the undertaking. The piers are of cast-iron cylinders, filled with concrete. The bridge consists of girders constructed on a modification of the bow-string principle, and there are 22 spans, as follows, commencing from the Lydney shore—one of 134ft., 2 of 327ft., 5 of 171ft., 13 of 134ft., and one (including swing bridge over canal) of 196ft. The two principal spans have a headway of 70ft. above high-water mark, and there is a rising gradient on the bridge of one in 140. On the Lydney side the bridge is approached by a massive viaduct of twelve arches, about 70ft. in height, and on the opposite side by an iron swing bridge over the Gloucester and Berkeley Canal. The total length of the bridge, including these approaches, is 1,387 yards. It forms the connecting link on a line four miles in length, commencing with a junction with the Severn and Wye Railway, near Lydney Church, and after crossing the Severn near Purton Passage, terminating at the Sharpness New Docks by a junction with the Midland branch from Berkeley-road. All the works, except the bridge itself, are constructed for a double line of rails. Of the Lydney tunnel, which is 506 yards long, only 20 yards remain to be excavated and lined, and this will be completed in a few weeks. The railway approaches are progressing satisfactorily, and it is anticipated that the work will be completed by midsummer, 1879. The engineers for the structure are Mr. G. W. Keeling, of Lydney, and Mr. G. W. Owen, of Westminster, and the consulting engineer is Mr. Thos. E. Harrison. The contractors for the bridge are Hamilton's Windsor Iron Company, of Garston, Lancashire, Mr. E. Earle being the local manager. The present contractor for railway approaches and masonry is Mr. Griffith Griffiths, of Lydney.

The Town Council of Brighton are about to expend £15,000 in laying new mains and otherwise improving the water supply, in accordance with a report by Mr. Edward Easton, C.E.

At Burnley, on Monday morning, some shop premises newly erected over the river Brun, near the bridge at the bottom of Standish-street, fell to the ground. The building consisted of two shops three stories high, divided into six and seven rooms respectively, and although not quite finished, one of them had been opened. It was built on iron girders, H-shaped, spanning the stream. The girder at the back gave way first, and the others following, the joists were torn out of their sockets, and the building collapsed into the stream, breaking an adjoining bridge. Fortunately the premises were unoccupied at the time (3 a.m.) and no personal injury occurred. The contractor for the building was Mr. Smith, a town councillor of Burnley.

At Sowerby Bridge several important contracts are in course of completion for the urban authority, including the erection of board-room offices, public baths and abattoirs, alterations to the gas works. The sewerage of the district is about to be undertaken by the local board.

A new church, to be dedicated to St. John the Evangelist, is about to be built at Worley, near Halifax. Mr. W. Swinden Barber is the architect, and the estimated cost is £4,000.

The first sod of a new board school was laid at Sowood by members of the Stainland School Board on Wednesday week. The school is Gothic in style, and will accommodate 174 boys and 100 infants. Adjoining the school is a master's residence. Mr. C. F. L. Horsfall, of Halifax, is the architect; the contracts amount to £2,150, the principal being those for mason's work, Mr. B. Edwards, Stainland, £1,250; for joinery, Mr. James Holroyd, same place, £375 16s.; and that for plastering and slating, Mr. S. Collins, also of Stainland, £293 15s.

The Teignmouth local board decided at their last meeting, after a division, to submit the plans for the sewerage of the district, prepared by their surveyor and adopted by a committee, to some competent engineer.

A new cattle market was opened at Rugby on Tuesday week. It has been constructed at a cost of £7,000 from the plans and designs of Mr. W. Stewart, the town surveyor.

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OUR LITHOGRAPHIC ILLUSTRATIONS.

WHAPLODE AND MOULTON CHURCHES.

THE parishes of Whaplode and Moulton adjoin, and are in that part of South Lincolnshire known as Holland. Like most of the Fen churches these, from which details are selected for illustration, are large and of considerable architectural merit. Whaplode is in style principally Norman and Transitional. The tower of the latter period is built out from the south aisle, on a line with chancel arch, grouping picturesquely with the gable over same, in which is a Norman niche. It is arcaded in stages, and originally communicated with the body of church by an exceedingly fine arch now built up. The nave arcade (if I recollect rightly) is of seven bays, some of the heavy Norman piers having a preposterous effect by being much thicker than the walls they carry. Only about half of the spacious interior is seated. Moulton church dates chiefly from the 13th and 14th centuries. The lofty tower and spire, with pinnacles and flying buttresses, is of Late Decorated work, and occupies the usual westerly position. The simple arcade of nave is of singularly beautiful proportion and detail. The columns are of varied section, as in bay illustrated, some of them being circular, while all have the circular abacus. A peculiarity of the jointing of the arch stones at springing should be noticed. The church is restored.—J. LANGHAM.

THE EXCHANGE ART GALLERIES, LIVERPOOL.

MESSRS. T. AGNEW AND SONS' new galleries at Liverpool, which we illustrate this week, are noticeable for the material employed. The whole of the outside work, with slight exceptions, is finished with bricks. The cornices, mouldings, and carving are all executed in red brick, every brick being in fact worked on the premises for its position, and the carving executed after the work was set, in the same manner as the galleries of Messrs. T. Agnew and Sons in London. The whole of the woodwork in the portion of the premises occupied by Messrs. Agnew is executed in "real" woods, including American walnut and French black wood and pitch pine. The walls throughout are lined with material, thus avoiding all necessity for paint. The staircase, with its peculiar soffit and lead lights, and the ante-room at the top are especially noticeable features. The large picture gallery is lighted by a top light around the ceiling abutting on the wall line instead of in the centre of the ceiling. The contractors for the work were Messrs. Haigh and Co., of Liverpool; the marble mosaic floor by Messrs. Trollope, of London, who also provided the material for covering the walls, &c. Messrs. Salomons, Wornum, and Ely are the architects.

NOS. 1 AND 2, LOWTHER-GARDENS, KENSINGTON.

IN a double-page plate this week we illustrate by perspective view as well as by plan, the new houses recently erected at Kensington in Lowther-gardens, adjoining Lowther Lodge, the well-known mansion built a few years since from the designs of Mr. R. Norman Shaw, R.A.* The mansions illustrated to-day were built for Colonel Makins, M.P., who lives in the larger of the two; the other he has sold. The form of the ground presented a site of extreme irregularity, but all the rooms are of rectangular form, the general plan at the same time filling up the irregular shape. How this has been managed will be seen by the plans of the two principal floors which we give. The materials used are red brick enriched in parts by carving, and red tiles for the roofs. The architects are Messrs. J. J. Stevenson and A. J. Adams, of Bayswater, and our drawing is from that exhibited this year at the Royal Academy by Mr. Stevenson.

YARMOUTH TOWN HALL.

TO-DAY we publish a perspective view and two of the principal plans illustrating a design prepared for the above town hall, and submitted under the motto "Use." The perspective view shows an exterior, designed in a phase of Gothic, which has obtained favour in the erection of some of our modern town halls, and is of a monumental character, not suitable for public buildings. The plans are carefully arranged, and amongst other points on the ground plan may be noticed the ample entrance accommodation—that for the public being direct from the various fronts, whilst private entrances for the police, prisoners, stores, &c., are provided under the covered way, shut off from the street by iron gates. The principal floor-plan shows a corridor along one side of the public hall, with grand stairs at one end admitting to the front part of hall, and stairs at the other end leading to back part of hall, and the gallery, and to the porters' rooms above. A third staircase from the ground floor entrance, and witnesses' rooms, &c., leads to the waiting hall in connection with the two courts, between which is a private corridor, with stairs to cells below, and the jury-rooms on the floor above. The design was intended to be erected of brickwork, with stone facing to the exterior elevations, and was prepared by Henry Perkin and George Bertram Bulmer, architects, of Leeds.

HALL AND STAIRCASE.

THIS illustration of a hall and staircase, designed by Mr. E. W. Poley, is taken from a drawing which was exhibited at the Royal Academy.

* Illustrated fully in the BUILDING NEWS, June 25, 1875.

ARCHITECTURAL & ARCHÆOLOGICAL SOCIETIES.

BERKS ARCHÆOLOGICAL AND ARCHITECTURAL SOCIETY.—On Thursday week the concluding excursion for the season of this society was held. The Maidenhead district was visited, and the arrangements were carried out by Mr. E. J. Shrewsbury, the local secretary. The Reading contingent left in the 10.23 a.m. train, and at Maidenhead were joined by a party from that locality. The excursionists were soon on their way to Bray Church. The Rev. Charles Kerry, vicar of Matfen, Northumberland, and author of the "History and Antiquities of the Hundred of Bray," read in the church a paper on the history of the edifice, and described the old stained glass and the mural decorations which he had found during his connection with the parish 17 years ago. The party then walked to the Hospital of the Fishmongers' Company, where they were received by the chaplain. A drive of a quarter of an hour brought the party to Ockwells, an ancient manor-house of peculiar interest, where luncheon was partaken of. White Waltham was the next place visited, and then the party drove to Shottesbrooke Church, which was explained by Mr. Joseph Morris, of Reading. From Shottesbrooke a pleasant drive brought the excursionists to Maidenhead Thicket, where the British flint pits and the remains of a Roman encampment were inspected, and remarks made on them by the Rev. C. Kerry, and then on to All Saints' Church, Boyne Hill, where the vicar received the party. Maidenhead Town Hall was reached exactly at five o'clock, and the company immediately sat down to a cold collation, under the presidency of Sir John Conroy. Having glanced at the charter, records, &c., belonging to the borough, the visitors from the Reading district proceeded to the railway station, and left by the 6·42 p.m. train.

COMPETITIONS.

JARROW.—At a meeting of the Jarrow Town Council, on Wednesday week, the committee appointed to receive designs for the proposed new hospital for infectious diseases reported that 24 designs, under various mottoes, were sent in for competition. The committee had selected three designs, and placed them in the following order:—First, "Nothing venture, nothing have," cost, including boundary walls and drainage, £4,500; second, "Experience," cost between £3,000 and £4,000; third, "Beta," cost £3,520. The committee recommended that the design "Nothing venture, nothing have," be adopted, subject to the approval of the Local Government Board. An animated discussion as to the merits of the first and second designs ensued, in the course of which some extraordinary statements were made respecting the conduct of one member, a councillor, and his relative, the author of the second competing design. The report was adopted. Subsequently the Mayor opened three letters from the authors of the plans, and declared the architects to be:—"Nothing venture, nothing have," J. H. Morton, architect, 15, King-street, South Shields; "Experience," Thos. Oliver, architect, Newcastle; "Beta," John Gibson, Grainger-street, Newcastle.

LEICESTER.—A new Wesleyan chapel is about to be built in King Richard's-road, Leicester, at a cost of £4,500. Messrs. Redfern and Sawday, and Mr. H. R. Harding, architects, of Leicester, and Mr. Ellis, of Liverpool, have been invited to send in competitive designs.

SALFORD.—WILTON FEVER HOSPITAL.—We are told that no more than twelve designs have been received in competition for the extension of the Fever Hospital, but that these include some of considerable merit. The premiums offered are £100, £50, £25, and the new buildings must be of the plainest description.

YEADON.—A new Town Hall and Mechanics' Institute are about to be erected at Yeadon, at a cost of about £5,000. For this, in reply to an advertisement in our pages a few weeks since, 30 architects have just submitted designs. A commission of 4 per cent. on the total estimated cost will, according to the issued conditions, be paid to the successful architect on the completion of the work, and a sum of £25 to the competitor whose plans are considered by the committee to rank second. No member of the Institute, by the rules of that body, should have entered the contest, seeing that less than five per cent. commission is to be paid. It remains to be seen, however, if the 30 competitors do not include any one associated with the R.I.B.A.

The foundation stones of a United Free Methodist school chapel were laid on Saturday week at Newcross-street, West Bowling, Bradford. The building will be Italian in style, freely treated, and will accommodate 500 scholars. Mr. Samuel Robinson is the architect.

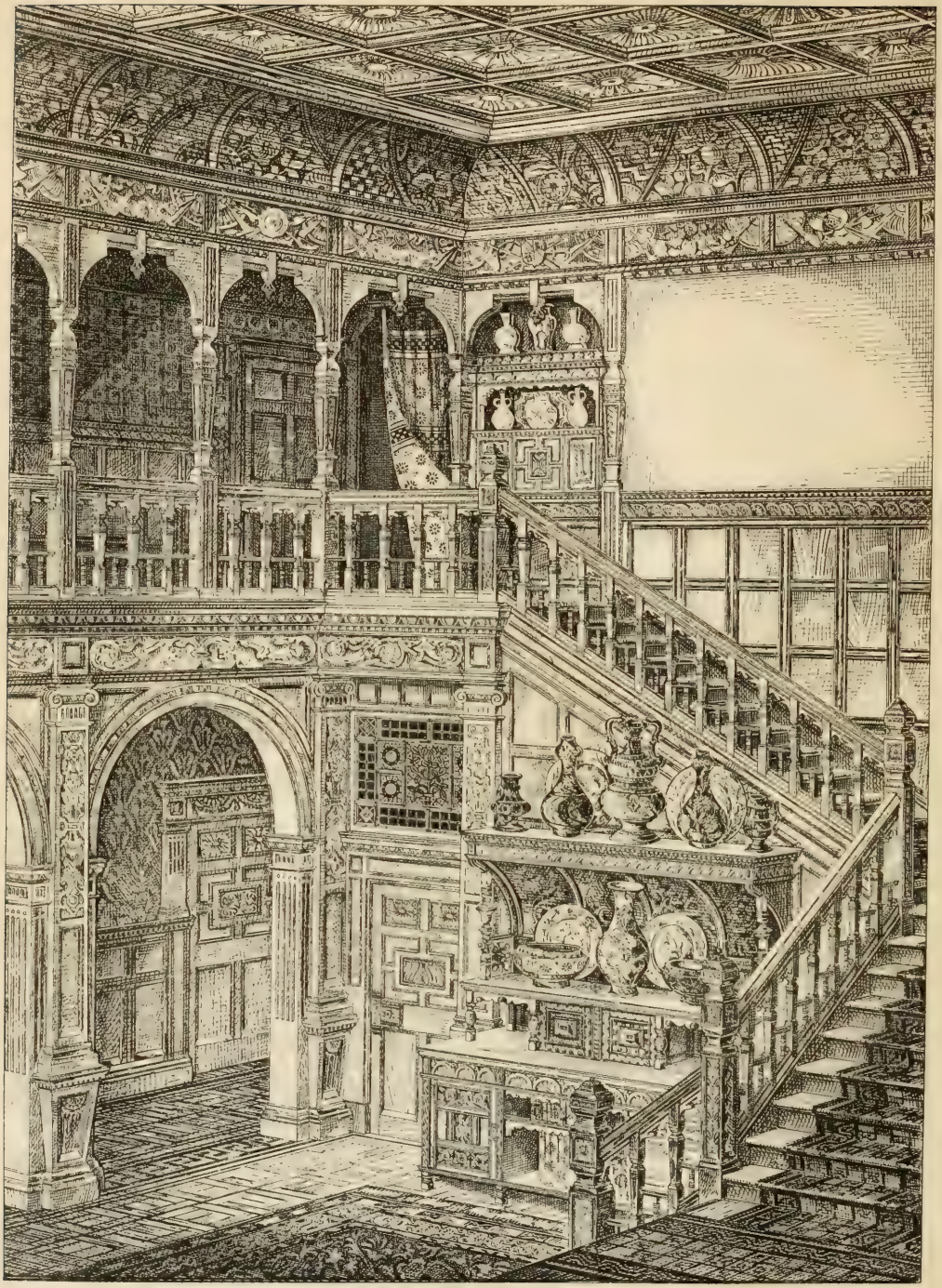
Swimming baths and new wharves are about to be constructed near Holborn Wharf, Rochester, by the trustees of Watt's charity. For the latter work the trustees accepted last week the tender of Messrs. Bessent and Son for the supply of timber, and that of Messrs. Collis and Stace for ironwork.

A new cemetery is about to be laid out at Langport, Somerset, on plans prepared by Mr. Hall, architect, of London. For the execution of the work the tender of Mr. H. Davis, of Langport, has been accepted by the local authorities at £1,185.

Bradden old church, in the Isle of Man, is in course of restoration, including opening out of the tower arch, repairs to the spire, and alterations to the ceiling.

The foundation stone of a new church, to be dedicated to St. Leonard, was laid at Langho, in Billington township, on Monday. The new building replaces a ruinous old church now supported by props at the west end; this will be repaired and used as a mortuary chapel. The new fabric has been designed by Messrs. Paley and Austin, of Lancaster; the portion now being built consists of nave, 57ft. by 34ft.; south aisle, 10ft. in width, and chancel, 34ft. 6in. by 24ft., these seating 350 persons. The roof is open timbered. The contract has been signed by Mr. Thomas Hacking, of Clayton-le-Moors, for £3,089. The entire scheme involves the extension of a bay westward, including tower and porch, and will cost in execution about £6,000.

It has been definitively decided that Waterloo-bridge is to be thrown open free to the public in the second week in October.



J. Akerman Photo lith London

Hall & Staircase design by E.W.Poley

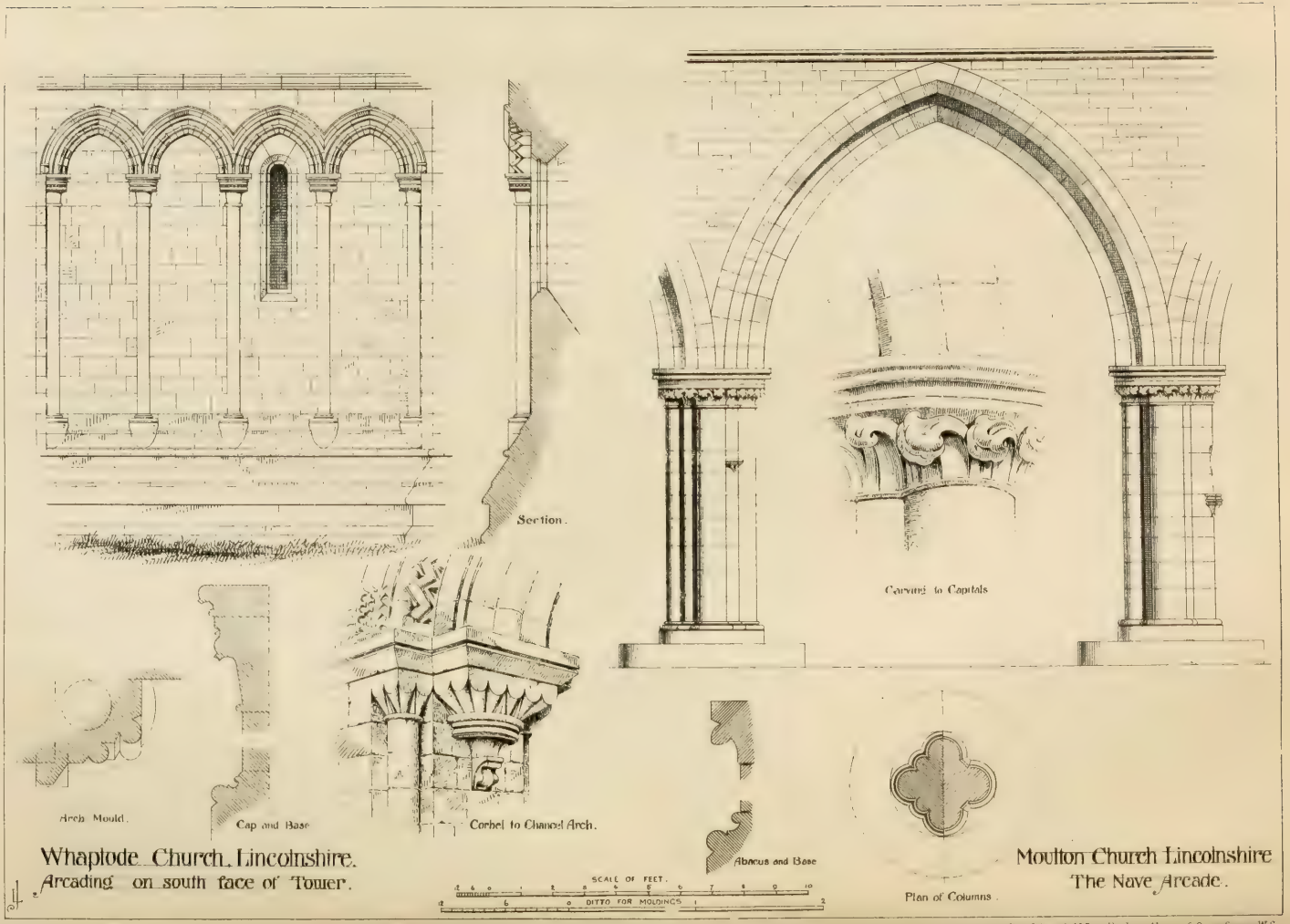
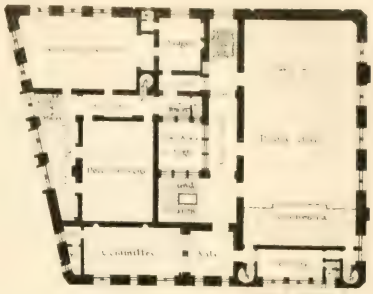


Photo Lithographed & Printed by James Akerman 6, Queen Square W.C.

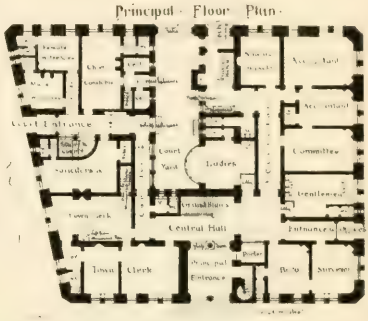
Great Yarmouth Town Hall Competition

Design under Motto "OSE"

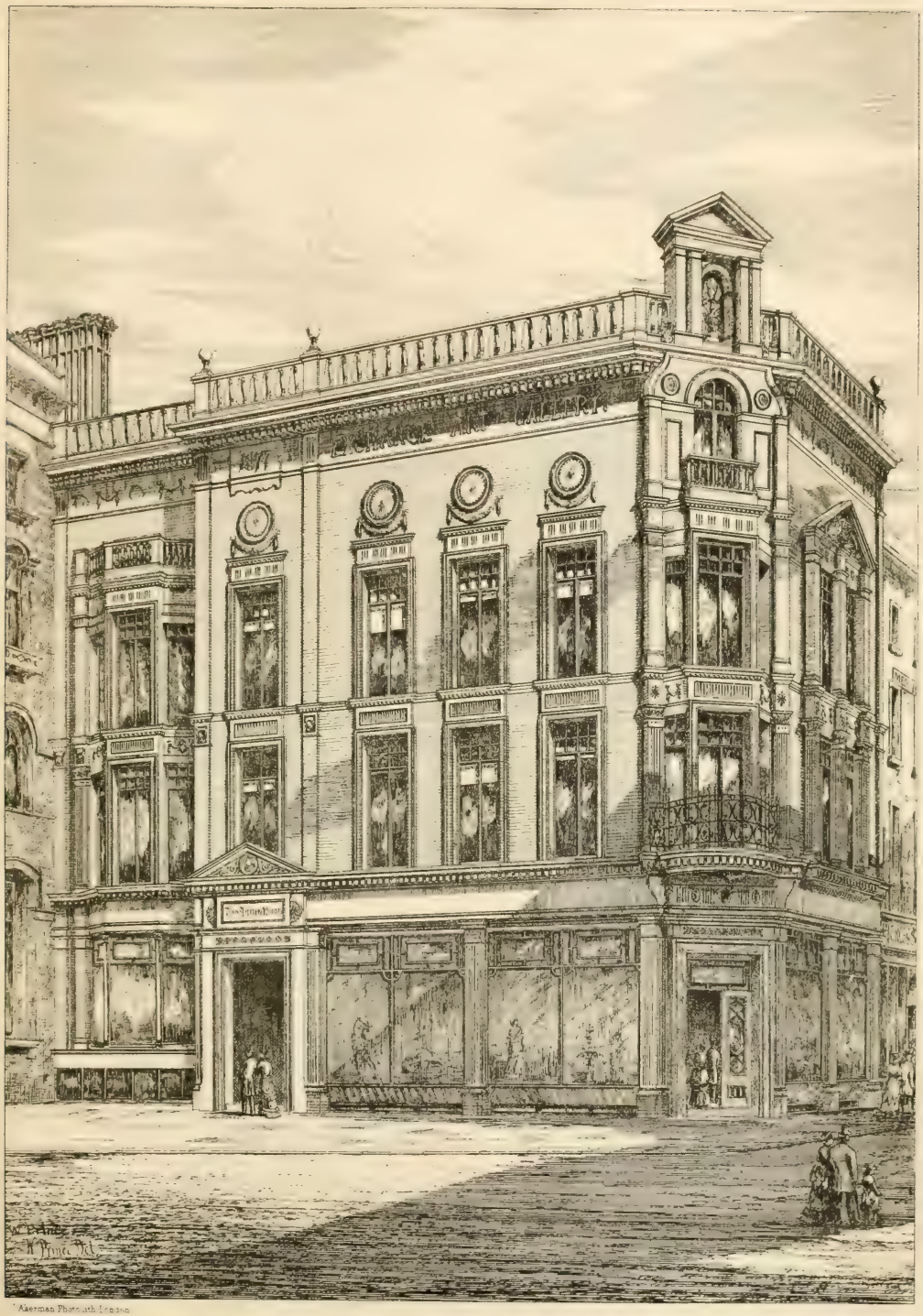
H. Perkin & G. B. Bulmer Architects, Leeds.



Principal Floor Plan



Ground Plan



Akerman Photo. ith London

THE EXCHANGE ART GALLERIES LIVERPOOL FOR Messrs AGNEW & SON

MESSRS SALOMONS, WORNUM & ELY ARCHTS

BUILDING NEWS DESIGNING CLUB.

SECOND SERIES.

AGREEABLY to the promise made in answer to numerous applications we have commenced a second series of our Designing Club. We have selected larger problems, extended the time for preparation of designs, and offered an additional prize; and to-day we publish the club rules and first list of subjects.

1. Drawings to be sent in 28 days after the publication of the list of subjects.

2. Usually two subjects will be given every month, from which a competitor may choose.

3. The drawings to be executed in firm black lines on white drawing paper, in sheets of the absolute size of 22in. × 14in., with no washes or tinting in colour whatever. Outline to be the first consideration; but drawings may be slightly shaded with shadows executed wholly in line. Sectional parts to be shown in ruled "hatching," or blocked in. The scale to be used will be given with each subject.

4. Drawings to be forwarded unmounted, by post, care being taken to roll the short way of the drawing, as packages over 18in. long are not transmissible through the post.

5. On entering the class (which may be done at any time) each competitor is required to furnish his name and address, which must be written legibly on the back of each drawing, as a guarantee of good faith, the *nom de plume* the author intends to adopt being boldly marked on the front of each separate drawing.

6. Prizes of £10 10s., £5 5s., and £3 3s. will be awarded to the best series of designs, such series not to consist of less than twelve subjects. Our decision to be final.

7. Before awarding the prizes any contributor will be expected to furnish proof, if necessary, as to his age, and the time during which he has been engaged in professional pursuits, though no candidate need be strictly an architectural student.

8. We reserve the right of arranging the drawings for publication in any manner we deem necessary.

9. A critical notice of the designs sent in of each series will be given in our issue following the receipt of the drawings.

LIST OF SUBJECTS.—I.

A. A villa, to be executed entirely in brick, suitable for a suburban site, on a plot measuring 70ft. by 200ft. Frontage to be placed 20ft. from roadway. Accommodation to consist of the usual reception-rooms and offices, all of which to be obtained, with the exception of cellarage, in two stories above ground level. Not less than five bedrooms to be provided, some of which may be arranged in the roof. Cost not to exceed £1,200, reckoned at a cost of 9d. per foot cube from footings to half-way up roof. Plans: two elevations and section to be drawn 1-6in. scale; sketch view optional.

B. Sheet of joinery details, drawn to a scale of ½in. to the foot, suitable for the reception-room doors and windows, dining-room fireplace and staircase to the above. Material: painted deal; mouldings may be shown ¼ full size.

OUR COMMONPLACE COLUMN.

COLOUR.

ALL colours result from the combination of the three primaries, *red*, *blue*, and *yellow*, as the main divisions of the spectrum. When combined in twos they produce the *secondaries* —*e.g.*, blue and red make violet; yellow and red, orange; blue and yellow, green. *Tertiaries* are again compounds of the secondary colours. Thus, orange and green produce citrine; orange and violet produce russet, or reddish grey; and green and violet, olive or bluish grey, &c. Buff and sage are tertiary tints. The former is made by a mixture of red and citrine, and sage by mixing yellow to slate colour. But the whole scheme may be best understood by a diagram representing two intersecting triangles forming a star of 6 points. On the 6 triangular points we have red, yellow, and blue, and the secondaries alternating—orange, green, and violet. The centre hexagon, which is divided by radii into 6 triangles, forms 6 tertiaries. *Complementary colours* are those which make up with any other the three primaries. Thus, the complementary colour of blue is orange, because the latter equals red and yellow; the complementary of red is green, for green equals yellow and blue. *Contrast* consists in juxtaposing primary colours; a compound contrast is when a primary is juxtaposed to its complementary colours, as blue and orange. *Harmony of Colour* consists in preserving in colouring the primaries, or in juxtaposing colours of affinity of hue; thus, shades of one tint, as buff, chocolate, and grey, produce harmony. There are some interesting phenomena in colour contrast. Thus we have *contrast of tone*, in which a dark-toned object looks lighter if we have previously been looking at a darker-toned one, and *vice versâ*. Again, in contrast of colour there is an objective difference between two colours, and there is a subjective modification of a mental kind. Thus, if we look at a series of red colours the eye wearies of red, and at length sees less red and more green, the complementary. Again, if we fix our eye on violet for a few seconds the colour fatigues the eye, and if we turn it away for a moment, or close it, we perceive yellow. The vision tires of one colour, and its opposite forms a pleasing reaction or relief. The simultaneous contrast of colour is very important to the artist, and we recommend the work of Chevreul on "Colour," The article, "Colour," in *Encyc. Brit.*, "Architectural Dictionary," and a series of articles in the BUILDING NEWS, Vol. 1874.

COST.

Under this head we give a few figures that may be of use in making rough estimates by the cubing process, though experience and local differences in transit of materials, &c., must be consulted in each case that occurs. Thus, in some localities cottages can be built as low as 4d. per foot, but in other districts 5d. to 6d. should be allowed. The following are approximate:—

	Per cube ft.
Sheds, farm buildings, and offices	3d. to 4d.
Cottages	4d. to 6d.
Small houses or tenements ...	6d. to 7d.
Suburban houses of ordinary size	6d. to 8d.
Gentlemen's residences—	
Reception rooms	9d. to 15d.
Offices	6d. to 8d.
Town halls, law courts, and other public buildings of a complex order	10d. to 15d.
Hospitals, barracks, &c.	7d. to 9d.
Churches and chapels	6d. to 10d.

From an extended experience in house construction we may say the price varies from £25 per square of 100ft. for small houses to £60 per square for villas of a superior class, and these figures may be relied upon as tolerably correct.

CONDUCTOR (LIGHTNING).

A lightning-conductor consists of a conical iron or copper rod of from 8ft. to 20ft. long, pointed with gilt, and a conductor proper, or that part between the conical rod and the earth connection, either of round or prismatic section. Galvanised iron is considered the best, though ropes of iron or copper wire are frequently employed. Spratt's copper-wire band conductors are easily fixed. There must be no break in the connection, no sharp turns. The minimum size for an iron conductor has been stated to be a square of about three-fifths of an inch. Copper being a better conductor may be less. All conducting masses, iron guttering pipes, window frames, should be avoided in fixing the line of conductor, or else be brought into conducting connection. The "earth connection" is also most necessary to be attended to. Dry earth is useless; the conductor should end in a well of water, or be led to a near watercourse or moist earth. A deep hole filled with charcoal is a good connection; so is a drain filled with the same material. The radius of protection of a conductor is supposed to be twice the rod's height.—See article in BUILDING NEWS page 233 *ante*.

CONSERVATORY.

In a conservatory the plants grow in borders of earth instead of in pots, as in a greenhouse, though in designing a conservatory both kinds of cultivation are provided for. The great essential in the construction of a conservatory is free ventilation, with means of opening any part of the sides or roof. Sliding sashes are probably the best for the sides and roof, though pivot-hung lights are also used. The roof of a conservatory should, of course, agree with the architectural character of the house, and perhaps the best form of roof is that known as Cranston's, in which each plane of glass allows a current below it, and no putty is used in fixing (see also Rendle's system of roofing). Iron principals are commonly used, but wood uprights are better non-conductors of heat. In heating conservatories an economical and deniable arrangement is to make the hall stove wholly or partly the means of supplying heat. A conservatory is very appropriately and effectively made to lead out of the hall, or to form a part of it, and it may also become a pleasing adjunct to a dining-room. For examples, we refer to the numerous illustrations in the BUILDING NEWS.

CREDENCE.

"C. F. W." writes:—Bingham states that this "place" has, in the *Ordo Romanus*, the name of *oblationarium*, *prothesis*, and *paratorium*. He, however, elsewhere says that "we never met with a *prothesis* or *paratorium* or *oblationarium* in express terms in any ancient writer." A correspondent to the *Ecclesiologist* (1847, p. 181) says, "that in the *Ordo Romanus* no place or thing whatever has the name of *oblationarium*; neither is *prothesis* made the explication of *oblationarium*, nor *oblationarium* of *prothesis*; nor does the word *prothesis* occur in the *Ordo Romanus* at all; nor, lastly, is any place or thing called *paratorium* for any such reason, or is applicable to any such purpose as is imagined by our learned author." From these scholarly papers on "the Credence" we quote when no author is given. Parker, in his "Glossary," says that "in many instances the place of the credence table was supplied by a shelf across the piscina." This, however, is a disputed point. Some assert that this shelf was used for receiving the cruets containing the holy oil. Others in opposition to the former reason say that "the shelf in many cases, from its small size, renders it impracticable" ("Handbook of English Ecclesiology," p. 66). In the earlier ages the presence of a credence is much questioned, since they had no need of one. "The laity made their offering of bread and wine," and one of the attendant deacons received the breads. He presented them to the archdeacon, who placed them upon the altar. The chalice is presented in the same manner. "In an ancient ritual of the Church of St. Martin, at Tours, and in which the chalice and paten are brought through the choir, during the gospel, by two subdeacons, there is an express direction that they shall continue to hold them before a certain altar till the end of the Gospel." This probably was no unusual custom, and from this we may almost safely infer that there were no such appendages to the altar as credence tables. The earliest indication of any receptacle analogous to the credence is, according to Martène, in an *ordo* attributed to Gaietanus (c. 1294-1352). It appears from the ancient MS., "Consuetudines of the Benedictines of St. Germain des Prés," "that the sub-deacon used a neighbouring altar on which to fold the paten in his veil during the censing." "As the decline of the practice of individual offering was gradual, it will be found that the introduction of the credence was gradual also, only that the credence came in by slower degrees than the practice of individual offering went out." M. de Caumont says that credences belonging to the second half of the 12th century occur only at the cathedrals of Lausanne, Sugères Pontigny, and are still rare before the 13th century. The same author again says: "If credences are very rare in the 12th century, they are met with everywhere in the 13th. It is to this period generally that we must assign the most ancient of those which remain to us. All the chapels of large churches are furnished with them; some have several of them placed on the right and left sides of the altar." M. Viollet-le-Duc quotes Thiers, who says: "It is only the credence on the side of the epistler which is used to put the chalice, cruets, the book of the Epistles, and that of the Gospels upon. That which is on the left side is not used for anything, if this is not for the sake of symmetry, or at the most to place candlesticks and *violiers* (flowers?) upon. In the middle ages one followed merely the first rubrics of the Roman missal, which require one credence only, on the side of the epistler. Formerly, however, credences were known neither to the Greeks nor to the Romans." "*Formerly*, however," adds M. V.-le-Duc, "is a little vague, and we find some credences above

the piscinas, or by the side of them—in churches built in the 12th and 13th centuries, by the side of the epistler." The form of credences is very varied—such as a small cupboard, niche in the thickness of the wall, stone shelf, bracket, and a table (St. Cross). They always share the characteristics of the periods in which they have been made.

CROCKETS.

From *croc*, a hook, are the bold leaf-like ornaments frequently found on the angles of spires, &c., of Gothic buildings. They are usually in the form of leaves, partly enfolded, fruit, animal, and sometimes human heads. The positions in which crockets are found are over tombs, porches, doorways, piscinas, windows, arcades, sedilia, fonts, buttresses, pinnacles, "and, occasionally, among vertical mouldings—as at Lincoln Cathedral, where they run up the mullions of the windows of the tower, and the sides of some of the arches; but they are not employed in horizontal situations" (Parker). In English architecture there is no trace of them previous to the Gothic period. In French architecture, however, as M. V.-le-Duc says—"The crocket takes an important place in ornamentation from the middle of twelfth century. The thirteenth century has particularly adopted this ornament; it is used with subtle ingenuity." The same author traces the birth of the crocket from an ornament found in the upper cornice in the nave of Vezelay church, which belongs to the first years of the twelfth century. M. V.-le-Duc, bringing his remarks on the crocket to a close, says—"If we have given a large number of examples of these *crosses* or crockets, it is because we have always intended to express to architects studying Gothic architecture the difficulty which they experience not only to compose and have this ornament executed—an ornament so simple in appearance, of so decided a character—but also to draw the crockets that they have before their eyes. In an architectural style there is not even one insignificant detail: the smallest moulding, the most modest ornament, have a participation in the physiognomy of the whole—a physiognomy which must be studied and understood." We may note that the word *crosse* means both a crocket and a crozier.

CROMLECH.

Masses of flat stones resting upon others, of pre-historic origin, and thought to be sepulchral. They have been ascribed to the Celts, but this idea has recently been refuted. The cromlechs of Ireland are found chiefly along the coast, and indicate migration of tribes, according to Miss Buckland. For particulars of these and other pre-historic remains, we refer the curious reader to our own pages, to the abstract of Miss Buckland's paper, read at the last meeting of the British Association, page 181, ante, and other reports of the Archæological societies for last year.

Two of the largest cromlechs in Britain, says "J. A.," remain at Plas Newydd, in Anglesey. Many others are seen in Wales, and found in Scotland, Ireland, Jersey, Brittany, and, in fact, wherever the religion of the Druids prevailed. They were thought by the old antiquaries to be altars on which victims were sacrificed; but there is no doubt that they were used as sepulchres.

CROSS.

Memorial Crosses: The principal are those erected by Edward I. in memory of his Queen Eleanor on spots where the body rested on its way to Westminster. Waltham cross is a well-known example; for the other two still remaining, those of Northampton and Geddington, see description in our issues for August 2nd and 9th, pp. 100, 101, 128 *ante*. We illustrated that at Waltham in the Sketch-book series in 1874; that at Geddington on August 11, 1876; and that at Northampton January 18th, 1877. *Market Crosses* were erected as preaching stands and for commemorating events. We may refer to crosses at Cheddar, Malmesbury, Winchester, Chichester, Salisbury, &c. We refer the reader to Milner's "History of Winchester" and Britton's "Architectural Antiquities."

"C. F. W." says:—We may divide crosses into three classes—the Tau, T, the oldest form of cross, the Greek +, and the Latin †. The first is found in Egyptian MSS. In these places it always has a loop attached to the crosspiece, by which it is held. It is held only by deities, and is symbolical of eternity—the key of life, *crux ansata*. The Tau cross is typical of anticipation, and should therefore be used in Advent and on ordinary days. The cross of Jerusalem is formed of four tau crosses joined at their bases. The Greek cross consists of four equal arms, and is the one adopted by the Eastern church, hence the plan of nearly all Byzantine churches. It is considered to be an ideal cross, typical of Christ's ministry, and should be used during Lent. The four equal arms are symbolical of the four Evangelists spreading the four Gospels to the four winds of Heaven. The cross of St. George is identical in shape with the above. We may derive from this form the crosses of St. Andrew and St. Patrick, which are also identical in shape. The colour, however, of the former is red, whilst that of the latter is blue. The Maltese cross and many others are derived from the Greek. The Latin cross is the one adopted by the Western Church, and is considered to be the one on which our Saviour died, and therefore has been called the Cross of the Passion (modern authors, however, usually assert that the true cross was one of the same shape as St. Andrew's). It is called the episcopal cross because of its being carried before bishops. It is typical of Christ's glorification, and should be therefore used at Easter. The triple cross is the same as the Latin, with the addition of two arms. It was borne only before the Pope. The patriarchal cross, so called on account of its being carried before cardinals, archbishops, and patriarchs, has two transoms. The cross of Calvary is a Latin cross mounted upon three steps, symbolical of faith, hope, and charity. The cross-crosslet is composed of four Latin crosses. M. V. le Duc observes that "during the middle ages crosses of stone or of metal were placed on the summit of religious buildings, on roads at the entrance of towns, and in cemeteries." According to Pugin crosses may be classed as follows:—"1, altar crosses; 2, processional; 3, roods on lofts; 4, reliquary crosses; 5, consecration; 6, marking; 7, pectoral; 8, spire; 9, crosses pendent over altars." Upon each of these crosses much could be written that would be most interesting, but we must leave them for the present.

CROWN GLASS

Is made by blowing in the form of circular plates of 50 to 60in. diameter. A quantity of glass in the pasty state is collected upon the end of a hollow iron tube, and this glass is then converted by blowing through the tube into a hollow globe of the requisite substance. This globe is transferred to the end of a rod, and, after several re-heatings, it is twirled round by the workmen somewhat in the manner that a mop is twirled to drive off the moisture. With this twirling the softened material is continually driven off from the centre by the centrifugal force, until at length the whole substance is converted into a flat disc of circular form, except at the centre where it is attached to the rod. The following table will show where a difference exists between crown glass and other kinds, and the percentage proportions of the chief components of several kinds of glass in common use:—

	Crown.	Flint.	Plate.	Bottle.	Tube.	Optical.
Silica	63	52	78	59	73	43
Potash	22	14	2	2	12	12
Soda	,,	,,	13	10	3	,,
Lime	12	,,	5	20	11	,,
Alumina ...	3	1	2	2	1	1
Oxide of lead ...	,,	33	,,	,,	,,	44
Oxide of Iron ...	,,	,,	,,	7	,,	,,
	100	100	100	100	100	100

—J. A.

CROZIER

Is a staff surmounted by a cross. It is often confused with the pastoral staff (see *post*). The crozier is carried by an archbishop, and is symbolical of primatial and metropolitan jurisdiction.

On Tuesday the Female Refuge, which has been erected in the Sandon-road, Stafford, was declared open. The building, which is a neat brick structure, has been erected at a cost of about £6,000. Mr. R. Griffith is the architect, and Mr. Moss the builder, both Stafford gentlemen.

ARCHÆOLOGICAL.

Cornish Antiquities.—At St. Just, near Penzance, during the past week, Mr. W. C. Borlase, F.S.A., discovered a pile of surface stones, which appeared to be a cairn of the same description as others in the neighbourhood, but of unusually large size. On driving in a level from the north-east side a wall was soon reached 11ft. in height, built of solid dry masonry, and sloping inwards, as it reached the top, in the manner of a beehive. This proved to be part of a circle 30ft. in diameter at the top, where the cone had been truncated, and not less than 40 or 50ft. in diameter at the base. On cutting through the outer wall at a height of 5ft. from the solid ground on which it was built, a second wall, similarly constructed, was discovered, placed concentrically with the outer wall at a distance of 5ft. 6in. within it. The whole of this structure, when perfect, cannot have been less than 18 or 20ft. high, and, by the immense quantity of *débris* found around, it may have been entirely covered in by a pile of stones. On sinking a pit in the centre, where miners had been working, there was found at a depth lower than had been reached by them an earth-cut grave, running north-east and south-west, 8ft. long and 3ft. wide. At the south-west end a transverse grave appeared, formed by a cave in natural soil, its bottom being 6ft. from the surface. This was reached through another grave by two steps. The whole grave was filled with black greasy earth, amongst which was found a stone "beeve" on the edge of the grave at the north-east end. On turning up a flat stone a little square stone vault appeared, 2ft. 3in. long, 1ft. broad, and 2ft. deep, roofed in by two covering stones. In one corner of it stood a little cylindrical urn quite plain, which was filled with black earth, on the top of which were two human bones and a thin circular piece of metal, which might have been a coin. Two feet from this cyst was a second similar one, containing another little urn and some fragments of a larger one. Three similar little vaults were found close by, one containing fragments of domestic pottery. The jawbone of an animal at present not determined lay near. As some of the stones fell away from the upper part of the tunnel a sixth cyst was brought to light, also containing fragments of an urn.

Dale Abbey.—By the consent of Earl Stanhope a committee of the Derbyshire Archæological Society commenced on Tuesday week, the 10th inst., the process of excavating the foundations of Dale Abbey. The operations have been attended with unexpected success. The foundations of the south side of the choir and its side chapels have been laid bare, as well as the bases of several of the columns. Innumerable fragments of window tracery, arch mouldings, and other dressed stone have been found, and the ribs of the vaulting, together with the centre boss of the groined roof of one of the side chapels, are almost complete. The lower courses of a fine staircase at the junction of the choir and north transept are almost complete. A quantity of encaustic tiles, ornamented some with heraldic, and others with set patterns, have been found, also bits of painted glass, some carved crockets, &c. The remains prove that a large conventual church was rebuilt in the Decorated period, but the bases of two of the columns are laid on Norman foundations. The men employed are said to be careful workmen, and nothing is allowed to be done except in the presence of one of the committee.

At the quarterly meeting of the Chichester Diocesan Association, held at Brighton, on Thursday week, the following grants were made:—For enlargement and restoration of Maresfield Church, £60; for restoration of tower and spire of Mayfield Church, £25; for enlargement of Heene Church (second grant), £20; for building a chapel of ease in Iping Marsh (second grant), £20; and for building schools and teacher's residence at Silverhill, St. Leonard's-on-Sea, £40.

A memorial of the late Mr. Benjamin Colls, the head of the firm of Colls and Sons, contractors, Camberwell, and a prominent member of the City Corporation, is projected at Sutton, Surrey. It has not yet been decided whether it shall take the form of a tablet in the church, a cottage hospital, or a marble bust in the public hall about to be erected in the village.

Building Intelligence.

BLACKBURN.—A new Congregational church was opened at Furthergate, Blackburn, on Thursday, the 12th inst. The edifice is 70ft. by 46ft., with galleries on sides and at rear, and orchestra behind pulpit, the whole seating over 800 adults. Under the orchestra is a minister's vestry, and behind is a lecture-room 25ft. by 18ft. The walls are of stone, faced with Darwen parpoints. The roof is of six sets of principals, supported on cast-iron columns, which pass through the galleries. On each side of church, above the caps of columns, is a clerestory 3ft. 6in. high, consisting of a continuous series of trefoil arches and columns. The side windows are all double, and the heads of those lighting the galleries are filled with tracery. The pulpit and benches are of pitch-pine. Mr. John Wills, of Derby, is the architect; the cost has been about £4,500.

CAMBRIDGE. — The additional buildings at Pembroke College, in course of construction from Mr. Burges's designs, are in progress, but the library is not expected to be in readiness for use till next spring. The master's lodge and dining-hall have been occupied for some time. Near by the extensive additions to the anatomical schools are in active progress. Since the accident a few months back the concrete floor and roof have been removed, and there are being substituted wood flooring and slated roof. An effort is being made to get the rooms complete by October. Another block of buildings is proposed to be erected on the old botanic gardens, near to the street. Adjoining the botanical museum the professor of mechanics has built a large room, in which is stored valuable apparatus. Mr. Basil Champneys' new divinity schools are rapidly approaching completion in carcase. They are to be opened in May next.

COTHAM.—A new Wesleyan chapel is about to be opened at Cotham, near Bristol. The building is in the Early Gothic style, and constructed of Pennant stone from the Stapleton and Hanham quarries, with Westwood stone dressings. The interior dimensions are 66ft. 3in. by 45ft. 3in., and height from floor to pitch of roof, 48ft. The roof is boarded and panelled. The pulpit is elaborately carved. The chapel will accommodate 800 persons. The building will be ventilated by pierced ornamental panels in the ceiling. There are also ventilators in the floor. The heating apparatus has been put in by Mr. Skinner, of Stoke's Croft. Behind the chapel are Sunday-school premises and a minister's vestry. The large schoolroom is 46ft. by 30ft., and will accommodate 450 children. On the ground floor are the classrooms. The total cost of the premises will be £9,000. Mr. R. Curwen, jun., of Liverpool, is the architect, and the contract has been carried out by Messrs. Stephens and Bastow, Cheltenham-road. Mr. G. Dallon is clerk of the works.

EDGEHILL.—A new Congregational church at Edgehill, Liverpool, was opened on Tuesday week. The style adopted is Decorated Gothic, and the materials are Yorkshire shoddies and yellow Stourton stone dressings. The church itself is a parallelogram in form, 91ft. by 42ft., with transept 26ft. 6in. by 14ft., with the pulpit or platform in advance of the apse, arranged for an organ or choir. At the side of the church are vestries for the minister and deacons, heating chamber, &c. The height of the church from floor to ceiling is 38ft. The church, with gallery at west end, accommodates 860 persons. Mr. W. J. Mason, of 32, Castle-street, Liverpool, was the architect, and the works were carried out by Mr. William Litt, builder, of Bootle. The contract was £5,300.

HUDDERSFIELD.—The corner stone of a new market-hall, now being erected on the old Shambles site, Huddersfield, from designs by Mr. Edward Hughes, of that town, was laid on the 6th inst. The design is Gothic. There will be two departments of the market, the wholesale and retail. Two-thirds of the basement will be devoted to cellarage, and the remaining one-third will be set apart for the wholesale department. The general market will be on an upper floor, access to which will be gained by flights of stone staircases from King-street. There will also be entrances by steps from Victoria-lane and Shambles-lane. The area of the general market will be 166ft. in length and 71ft. 6in. in width, accommodating at present 72 stalls. The market will be covered by a wrought-iron lattice and girder roof, formed on the principle of the three-centred arch, divided into bays, V-shaped, of slate and glass, the latter facing north. Rising over the King-street front, but set back, there will be a clock tower 110ft. high, showing four clock faces, and tapering to a point. The frontages will be of stone, with ashlar dressings, and the remainder will be of pitch-faced walling. At the main entrances there will be wrought-iron gates to the outside, and wooden ones on the inside. The total cost will be about £23,900.

LEEDS.—On Thursday week afternoon the Leeds New Jewish Synagogue was opened. It is a square building, in the Gothic style, and has been designed by Mr. Kay, of East-parade, Leeds. The main entrance from Belgrave-street leads into a vestibule, from which there are two entrances into the synagogue proper. In the centre of the building is placed the altar, in which stand the reading-desk and the seats intended for the choristers. At the east end is the ark, which rises perpendicularly to a height of about 12ft., and is covered by a dome, sustained on four columns.

MORLEY, YORKS.— A new Congregational chapel was opened on Sunday week at St. Mary in the Wood. The chapel stands in an ancient churchyard, on a hill-brow whereon Divine worship has been conducted under various forms for nearly 1,000 years. It is built from the designs of Messrs. Lockwood and Mawson, of Bradford, in the Decorated Gothic style. It is 100ft. long by 45ft. wide, and consists of nave, side aisles, transepts, and organ chamber. The walls are built of Morley wall-stones and ashlar dressings. At the south-west end a tower and spire rise to the height of 140ft., and are conspicuous for many miles around. A chamber is provided for a peal of bells, and above this, at a height of 70ft., provision is made for a clock with four dials. Entrances are provided at the principal front, which lead into a spacious vestibule, from whence the gallery staircases are reached. The nave is rather wider than is usual. The church will hold about 850 people, and the cost is £7,500. Mr. Joseph Johnstone has acted as clerk of works.

MOSES GATE, BOLTON.—A new Wesleyan chapel was opened at Moses Gate, near Bolton, Lancashire, a fortnight since. The works have been carried out under two principal contracts—the first, the excavation and foundations, by Mr. Silas Seddon, of Little Lever; and the second, the superstructure, by Messrs. John Statham and Sons, of Pendleton. The new chapel is Gothic in style, cruciform in plan, and is built of brick, faced externally with Yorkshire stone parpoints, with finely tooled Yorkshire stone dressings sparingly introduced. The dimensions are—Nave, 77ft. by 42ft.; north and south transepts, 23ft. 6in. by 14ft. 6in. each; chancel, 24ft. by 14ft., having a minister's vestry on one side, with lavatory, &c.; and on the other side space is left for a large vestry or band room. The roofs are high pitched, partly open-timbered, the nave roof having hammer and collar-beam principals, with curved ribs springing at the sides from moulded stone corbels. The ceilings are panelled throughout. The chapel is lighted by gas pendents suspended to roof timbers. The chapel will accommodate 582 persons on the ground floor; the front gallery will accommodate about 100 scholars. The cost is upwards of £4,500. Mr. Thomas Ormrod, of the Town Hall-square, Bolton, is the architect.

OTTERY ST. MARY.—The south transept of the church of Ottery St. Mary has been restored and decorated by the Lord Chief Justice of the Common Pleas as a memorial to his late father and wife. The plaster of the walls has been replaced by a decoration of coloured tile mosaic, in which dull grey and reds are the prevailing tints. The nine windows in the transept have been filled with stained glass, and the roof has been decorated so as to harmonise with walls. Of the nine windows, one has been given by the Bishop of Oxford, one by Miss Mackarness, and another by Miss E. Coleridge, but the remainder (as well as the whole of the other work) by Lord Coleridge. Beneath the east window is a model of a full-length figure of Lady Coleridge, which is in course of execution in white marble by Mr. Thrupp. The whole of the work has been from the designs of Mr. Butterfield, of London. The mosaic was executed by Messrs. W. and B. Simpson, of St. Martin's-lane, London, and the woodwork by Mr. Digby, of Ottery. The entire cost has been about £2,100.

SPEENHAMLAND.—The ceremony of laying the corner stone of the new chancel of St. Mary's, Speenhamland, took place on Wednesday, the 11th inst. The additions to the present building comprise a new chancel, 30ft. × 22ft., and vestry, 28ft. 6in. × 12ft., which will probably be divided into two—organ-chamber over vestry and porch at east end of north aisle. The church will be seated throughout with benches in English oak, the choir stalls being of the same material. The cost of the additions and alterations will be upwards of £4,000. The works are being carried out by Mr. Samuel Elliott, builder, of Newbury, from designs by the architect, Mr. G. E. Street, R.A., Mr. J. W. Randle being the clerk of the works.

TEWKESBURY ABBEY.—At a meeting of the Tewkesbury Abbey Restoration Committee, held on Monday week, Mr. Scott, the architect, attended and produced an amended plan for the proposed font; it was unanimously approved of, and Mr. Collins's estimate, amounting to £204, was accepted. This is a special gift, Mrs. Moore presenting the bowl, which is of Purbeck marble, and Sir E. A. Lechmere the oak canopy. Mr. Scott was requested to investigate as to the ancient position of the font, and report to a future meeting. As to the future level of the floor of the nave, Mr. Scott reported that in taking up the old flooring traces had been discovered clearly showing the levels of the 11th and 14th centuries; he recommended the committee to adopt the latter, an especial reason being that this would be above the flood level of 1852. After discussion this recommendation was adopted.

WATER ORTON.—On Sept. 11, the foundation-stone of a new church, dedicated to SS. Peter and Paul, was laid at Water Orton, near Birmingham. Messrs. Bateman and Corser are the architects. The exterior is designed in the Decorated Gothic style, with a spire at the north-west end. The church will be built of Derbyshire stone, with dressings of Bath stone, the roof being covered with brown Broseley tiles. Bath stone will also be used in the interior, and the roof will be open-timbered. The cost is estimated to be £3,000, and seats will be provided for 250 people. The building contract has been accepted by Mr. Henry Mottram, of Tamworth.

YORK.—The building of new and extensive barracks at Fulford, near York, is being pushed forward with vigour, but it is not expected to be completed until the autumn of 1880 at the earliest. The site almost adjoins the cavalry barracks; the entire area of ground enclosed is 34 acres. Facing Fulford-road stands the arsenal, which, when finished, will be of adequate dimensions for the storing of 6,000 stand of arms, and the keeping of military clothing for the same number of foot soldiers. This arsenal is very massive and substantial, is of considerable height, and is flanked at each end with a tower. It is built of solid brickwork, with stone dressings, the entire length of the frontage, including the towers, being surmounted by a battlement of stone. At each end of the armoury are the entrance gates, on proceeding through which are the guard-houses, connected with which are the cells for prisoners. Within a short distance on the left-hand side are in course of erection officers' quarters, with stabling, out-offices, buildings, and conveniences. Beyond the officers' quarters are four long blocks of soldiers' quarters, accommodating 450 men, in the rear of which are the cooking-rooms, and further on the bath-houses, canteen, reading and recreation rooms, library, and sergeants' mess. There is also provision made on the same side of the barracks for the accommodation of sixty married soldiers, their wives and families. Closely adjoining are wash-houses, laundry, infant school, quarters for the

schoolmistress, workshops for carpenters, painters, armourers, and other men employed in various avocations. In addition there will be the quartermaster's stores, drill-shed, skittle-alley, and playground. Immediately within the entrance gates on the right-hand side of the armoury will be another immense series of buildings, including guard-room and cells, officers' quarters and stabling, out-offices, billiard-room, and gymnasium. Six blocks of soldiers' quarters, similar in character to those on the depôt side, will be erected, so as to lodge 650 men. The sole contractors for the works are Messrs. J. and W. Beanland, of Bradford, who have about 500 men at work, and their acting manager is Mr. Robert Walker. At least ten millions of bricks will be used in the construction of these barracks, between thirty and forty thousand squares of glass, thirty thousand square yards of slating, and four miles of main and branch drains. The hospital associated with the cavalry barracks is in course of considerable enlargement. The main part of the building, which was only one story in height, is being increased to two stories, and otherwise extended, so that when the works are carried out the hospital will be able to treat about 150 patients.—In consequence of its having been decided to have a military centre at York, it was found imperative to have a branch war-office for the northern district. A large suite of buildings is now in course of erection, and will be completed at no distant day, at the corner of Melbourne-terrace, York, fronting Fishergate, and leading to the barracks. The building is of brick, and has stone dressings, its style being of the Elizabethan period. At the angle adjoining Melbourne-terrace is a lofty turret, which is provided with a large clock having two dials. It is expected that the entire building will be ready for occupation next month. Mr. Weatherley, York, is the contractor.

At Roose, near Barrow-in-Furness, on Thursday in last week, the wife of the mayor of Barrow laid the foundation stone of a new parochial workhouse. Mr. J. G. Macintosh is the architect, and the cost will be about £15,000.

On Thursday week a new Wesleyan chapel was opened at Garstang. Gothic in style, the chapel, which replaces an older one on same site, is 42ft. by 23ft., and seats, on pitch pine benches, 175 persons. At the rear is a schoolroom and classroom for 200 Sunday scholars. The builder is Mr. L. Titherington, of Preston. The cost of chapel and school has been £1,300.

At a meeting of the archdeacons and rural deans of the diocese of Bath and Wells, held on the 10th inst., Messrs. C. R. Wainwright, E. Hippesley, and A. Whitehead were re-elected surveyors of ecclesiastical dilapidations for that diocese for a further period of five years.

The *Preston Chronicle* smartly criticises the reason alleged for a recent vote by the county magistrates of Lancashire of a pension of £750 a year to Dr. Holland, late superintendent of Whittingham Asylum—viz., that Dr. Holland had designed the asylums at Prestwich and Whittingham, and had thus saved the county the expense of employing a regular architect. The *Chronicle* presumes that whilst Dr. Holland was drawing out plans he was not looking after patients, and that even if he had made them in his own time he could not expect more for them than a skilled architect, and such a person would never dream of charging a tithe of the money represented by a life pension of £750. Our contemporary is even disposed to think that if Dr. Holland had never touched the plans—had been content with giving a few suggestions which he could hardly have refused—a regular architect would have done the work better and possibly more cheaply.

New board schools at Gorse Hill, Stratton St. Margaret, were opened on Wednesday week. The schools accommodate 450 children, at a cost of £4,150. Mr. W. H. Read and Mr. W. Drew, of Swindon, were the joint architects, and Mr. Wiltshire, of the same place, the builder.

A correspondent of the *Guardian* has by accident discovered a new architectural effect, or at all events an effect which he has never seen mentioned, but which, he thinks, many readers will be glad to have pointed out to them:—"If you stand on the terrace in front of the Adelphi you will find that at a point nearly opposite No. 2 the Clock Tower will be seen as if it were consolidated with the Victoria. It exactly fills up the space between the corner turrets of the latter, and its quasi-spire appears to spring from the midst of the pinnacles. The splendid effect produced by giving the Victoria Tower an appropriate crown must be seen to be appreciated."

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TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.]

All letters should be addressed to the EDITOR, 31, TAVISTOCK-STREET, COVENT-GARDEN, W.C.

TO OUR READERS.—We shall feel obliged to any of our readers who will favour us with brief notes of works contemplated or in progress in the provinces.

Cheques and Post-office Orders to be made payable to J. PASSMORE EDWARDS.

ADVERTISEMENT CHARGES.

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Cases for binding the half-yearly volumes, 2s. each.

RECEIVED.—W. J. F. and Co.—B.—H. and Co.—McN. R. and Co.—J. B. H.—O. and Co.—C. B. and T. Co.—J. McD.—W. N. (shall have early attention).

DRAWINGS RECEIVED.—B. and R.

J. T. S. (You do not say whether the piece of ground is bounded by straight or curved lines. If the former divide it into triangles by straight lines, and take the area of each, adding them together. To find the area of a triangle multiply the base by half the perpendicular height. If the ground has a curved and crooked boundary, divide by diagonals into triangles, and take offsets to the boundaries; the latter pieces can be computed by taking the perpendicular breadth at several points, halving the extreme breadths, adding thereto all the intermediate ones, and multiplying result by the common distance between them.)—TWO COMPETITORS. (Too late for insertion.)—STUDENT. (You will get both of Lockwood and Co., 7, Stationers' Hall-court.)—G. W. G. (He cannot remove them legally.)

ERRATUM.—The signature to the letter on Tramways, on p. 279, should have been "Wm. Allen Dixon," not "Davis."

Correspondence.

AN ACT OF VANDALISM.

To the Editor of the BUILDING NEWS.

SIR,—"Some folks are wise, and some are otherwise." It is for the Newcastle people to settle which is the case with their Town Council. Some time ago they settled to put their architectural work into the hands of their engineering staff (not, however, without opposition from the N.A.A.), and now the borough engineer proposes to demolish the Carlisle Tower to make a larger site for the Free Library.

Hoping that "Dum Spiro Spero," "Novocastrian," and others, possessing as much influence as he does, will continue to be up in arms against this crime, and also that you will lend your powerful aid in assisting him and others of like mind—I am, &c.,

CARL BUDGE.

REMARKABLE SEPULCHRAL SLAB AT CARLATTON.

SIR,—Referring to the sepulchral slab in a farm-house at Carlatton (see BUILDING NEWS of Sept. 13th, p. 264), would the suggestion be too fanciful that the sword on the sinister side of the cross may be explained by a reference to Ephesians, chapter 6, verse 17: "The sword of the spirit," &c., Henricus de Newton being doubtless a preacher as well as an ecclesiastic? The 46th canon (of 1603) contemplates the possibility of these being "beneficed men, not preachers," and although civil and ecclesiastical dignities are occasional held by the same individual—*e.g.*, the late Duke of York (second son of George the Third) was also Bishop of Osnaburg—I would suggest, under correction, that such an explanation as is ventured above might account for the cross being flanked by a chalice and book on the one side, and by a sword and sword-belt on the other.—I am, &c.,

J. L. H. S.

THE SHREWSBURY EYE, EAR, AND THROAT HOSPITAL COMPETITION.

SIR,—Designs were invited for the Shrewsbury Eye, Ear, and Throat Hospital—exactly a month ago being the date for sending in. Not having seen any notice in your columns of the result of the competition, I shall be glad to know from any of your readers the position of matters. Probably this would relieve the minds of others as well as of myself.—I am, &c.,

A COMPETITOR.

THE NATIONAL COMPETITION, SOUTH KENSINGTON.

SIR,—In your issue of the 16th Aug. a notice of the National Competition at South Kensington contains the following remark, in alluding to the designs for wrought-iron work:—"Others are taken, with little modification, from Macfarlane's catalogue, as, for instance, two from Belfast." As we are the students of this school whose designs are being exhibited at South Kensington, it follows that two of our number have been charged with gross plagiarism. Now, we beg to state that four of us have not even seen the work in question, while the other saw it for a short time only several years ago, and before designing had been attempted by that student. The stricture therefore, to say the least, is most unfair and unjust; so that we shall feel obliged by your giving publicity to this contradiction.—We remain, yours, &c.,

W. M'KENZIE.
W. M'GOWAN.
JOHN M'KENZIE.
J. COULON.
S. M. THOMPSON.

School of Art, Belfast, Sept. 17.

[The similarity is obvious, nevertheless.—ED.]

The building erected at Birkenhead for the Welsh Eisteddfod is entirely constructed of wood, and is over 200ft. in length and about 80ft. in width. The style resembles that of the building erected for Messrs. Moody and Sankey during their stay in Liverpool, but with a higher pitch of roof. The cost has been nearly £10,000, and the building will seat from 7,000 to 8,000 people. Mr. R. Williams, Rock Ferry, has been the builder, the designs having been gratuitously furnished by Mr. Humphreys, Bootle.

The contract for a tower and spire for Trinity Church, Aberayron, has been taken by Messrs. Roderick Williams and Son, of Aberystwith, at £900, the work to be finished by Nov. 1, 1879.

The Episcopalian cathedral of Tuam is to be re-opened on Oct. 9; the works of restoration now completed have been in progress for sixteen years past.

New board schools for the Billericay and Great Burstead Board were opened last week. They accommodate 400 children, and cost £4,478 10s. Mr. J. E. K. Cutts, of London, is the architect, and Messrs. W. Russell, of Billericay, and J. Cross, of Hutton, were the contractors. The fittings were furnished by the Educational Supply Association. We illustrated the buildings on July 13, 1877.

A memorial church has been erected adjacent to Reedham Asylum, Caterham Junction. It is Decorated in style, seated for 300 children and 150 adults, and has cost £3,717.

The chancel and tower of Burford Church, Oxon, were re-opened after restoration on Tuesday. Mr. Street, R.A., was the architect, and Mr. Groves, of Milton, the builder.

A committee of the Town Council of Colchester have received a report from Mr. Edward Burgess, the architect called in to advise as to the possibility of improving and enlarging the present town hall in High-street, or whether it would be better to build afresh. Mr. Burgess recommends the latter course, on the grounds of convenience of arrangement and architectural effects.

Memorial stones of a new English Baptist chapel were laid at a site in Priory-street, Cardigan, on Wednesday week. Mr. Morgan, of Carmarthen, is the architect, and Mr. Woodward the contractor.

Intercommunication.

QUESTIONS.

[5508.]—**Chimney Flues.**—I am about to build a pair of semi-detached cottages, and am recommended to have the brick flues 9in. square inside; I should be very glad to have the opinion of some one experienced, as to whether they would be large enough. —J. N. J.

[5509.]—**Racquet Court.**—Would any of your readers be kind enough to inform me if they know of any cheap way of building a racquet court near a country house, where there is an abundance of wood available?—W. W.

[5510.]—**Didron's Works.**—Can any reader inform me whether M. Didron's "Manuel d'Iconographie Chrétienne" is a completed work, and whether it has been translated into English? I should also be much obliged for a list of the titles and publishers of his principal works.—C. F. W.

[5511.]—**Hatfield's "Tranverse Strains."**—Wil any reader who is studying Hatfield's "Transverse Strains," kindly communicate with me, for the purpose of comparing demonstrations and results?—HUBERT N. REYNOLDS, Camillus, New York.

[5512.]—**Chimney Stalk.**—Will any of your correspondents give me an opinion on the following subject? I built a chimney stalk 180ft. high; the first 40ft. of the stalk is 27in. work, and the whole of the work is built with panned lime, and every course flushed in with the same. There are three iron hoops in the chimney in the first 40ft., also a fire-brick lining for 20ft., 4½in. clear of chimney, and every precaution taken in case the chimney should rend in any way. When it was finished, I connected one boiler, and all went well for eight days; at the end of that time I let in another, and in two days the chimney rent in two places to the height of 40ft., commencing 10ft. from the base. The rents are almost plumb, and right through the solid bricks. This is the first case of the kind in my experience of fifteen years, and I should like to know the cause.—BUILDER.

[5513.]—**Notice to Leave.**—A month ago I engaged with an architect of this town as assistant. We made no special arrangement as to notice in case of leaving. I commenced duty on a Tuesday, and received on Saturday a week's salary less the Monday. After being employed about a fortnight we disagreed, and he gave me notice to leave that day week (Wednesday). Does the notice hold good when given on a Wednesday after I had commenced another week? Can I not recover the remaining half week's salary? Can I not recover railway fare one way from the town I left after being discharged after so short a time in his service, the time being insufficient to test one's abilities, the notice being given in a fit of passion?—W. F., Liverpool.

[5514.]—**Damp Walls.**—An angle of a house (the walls of which are of 14in. brickwork) situated on the sea-coast, directly faces the S.W., and whenever any rain, however slight, comes from that quarter, the wet soaks right through the bricks and pours down on the inside, to the great destruction of the plastering, papering, &c. Required a remedy.—ARCHITECT

[5515.]—**Fastening Railing to Stone.**—I am desirous of ascertaining whether it is better to run railing or other ironwork into stone with lead or sulphur. I believe the former is more generally used, and by many preferred, but the latter is cheaper, and from specimens I have seen seems to me to make quite as strong a job and a much neater finish. Any information respecting the way each is done, and the reasons for preferring one to the other, will be thankfully received by—GOTH.

[5516.]—**Contracts.**—A local board advertise for tenders for a public building, and, in writing, signify their acceptance of a certain tender. The contract is, however, not signed when the whole thing is upset by the Local Government Board, who disapprove of the plans. Can the accepted contractor legally claim compensation from the local board for loss of anticipated profit, and for declining on their account to undertake other offered work during the two or three months that elapse between the acceptance of such tender and the decision of the Local Government Board?—GOTH.

[5517.]—**Italian Architecture.**—Can any reader recommend from experience a thoroughly good and practical illustrated work on the above?—B. B.

[5518.]—**Removing Polish from Wainscot.**—A favour would be conferred if any reader would give a recipe which would remove polish from wainscot. —PURBECK.

[5519.]—**Macadam Roads.**—What is the best material for macadamising roads, streets, &c.? Are there any books or works on the subject? Where does the supply for London and suburbs come from? And what is the cost of same delivered at London? —ROADSTER.

REPLIES.

[5461.]—**Stamped Agreements.**—The varying opinions of your correspondents as to the requirements of the Stamp Acts in respect of agreements illustrate a condition of things which is far from being creditable to the law. On a question of abstract justice, or on questions of conflicting evidence, divergence of opinion must be expected. But a question of fiscal regulations is one on which no such difference is necessary, since it is in the power, and clearly the duty of Government to make it clear to the public under what conditions these taxes are levied. If these conditions were clearly defined opinions on the subject could not be so incongruous. One of the most lamentable but by no means uncommon exhibitions in our courts of law is to see a man sneaking out of his engagements under the shelter of the Stamp Acts. Since, however, there must be taxes, the loser must blame himself for his own lack of proper precaution or due compliance with the law. But when a man of business has, in all honour and integrity, affixed a stamp to his agreement, and supposes it to be sufficient, he may justly be held to be entitled to the protection of the law if the provisions of the law fail to make its requirements clear and distinct. In the case of agreement stamps surely it would be easy to define the duty. The intention of the Legislature probably was that for one agreement there should be one stamp (one duty, that is). How does it affect the fiscal rights of Government if there be twenty documents concerned in the affair? When properly identified by cross references and signatures there seems to be no reason why they should not be admitted as evidence if one of them bears a stamp. This is the practice I have followed, and have seen carried out in all cases. The proposition to send every document to Somerset House is appalling; it would choke all business, and revenue can assuredly be raised by less cumbrous means.—A LOVER OF JUSTICE.

[5461.]—**Stamped Agreements.**—The writer, who is an occasional reader of the BUILDING NEWS, begs to point out that the information given in the issue of Sept. 6th to a correspondent, "G. H.," as to a denoting fee of 10s. 6d. being necessary on obtaining an adjudication of the proper stamp, is incorrect. There is no fee now payable, nor has there been for some years, and an adjudication of the proper stamp is given gratuitously on a sufficient abstract of the document being presented. There is also no fee payable on obtaining a denoting stamp, which, by the way, is quite distinct from the adjudication stamp.—G. A. P. (A Solicitor).

[5488.]—**Strength of Wood Posts.**—I cannot understand how "M." can assert that the replies he has received lead him into his former difficulty. Hurst's formula, as I have said, is intended to apply to short columns only, in which crushing is considered. "J. S.," in his reply, has misled "M." by informing him that the formula which gave 5,353 tons is intended to apply to posts of great length, instead of rather the opposite condition of shortness. I believe, however, "M." will find even Hodgkinson's formula, if worked out correctly, will not give that sum. The instance mentioned by "J. S." of the Dantzic post experimented upon at Kirkaldy's works ought to be sufficient evidence to "M." that Hurst's formula is not far wrong.—G. H. G.

[5488.]—**Strength of Wood Posts.**—There is no formula in Spon's "Builder's Pocket Book," edited by Young, for a post where the length is 5½ times the breadth, the proportion given by "M." The nearest in that book is for posts with a length = 8 times the breadth (see page 117), and the rule given is "for oak posts crushing weight, 5,500lb. per square inch of sectional area; for red pine, 4,800lb." The result by this rule for red pine is about 309 tons crushing weight for a post of the dimensions given. "M.'s" mistake, and his question has been full of mistakes from beginning to end, is in using formula for posts where the length is greater than 30 diameters for one of only 5½ diameters. How "M." could persist in making such a blunder, especially as the same book gives different rules for posts of 8, 10, and 12 diameters in length, and so on (see page 117), is more than surprising. Hodgkinson's rule for posts where the "length exceeds 30 diameters," does not lead to the "absurdity" "M." ignorantly and carelessly states "that the longer the post the greater the weight it will support," as he would have found had he used it for posts of the proportions for which the rule is intended.—G. C.

[5499.]—**Thrust of Vault.**—In a groined vault the direction of thrust is clearly in the direction of the groin. To find it calculate the weight of the arch or vault comprised in one compartment, or between two adjacent piers; then the thrust may be considered equal to this weight multiplied by the length of diagonal groin, divided by 16 times the rise of arch. —G. H.

[5500.]—**Arch.**—The simplest way of finding the equilibrium of an arch is experimentally by a chain of uniform thickness, suspended and loaded at every link till it assumes the form of the required arch; then the weights correspond with the arch in equilibrium.—G.

[5502.]—**Value of Land.**—This may answer your correspondent's purpose:—Ground rent, £11 5s.; to sell at 25 years' purchase, £281 5s.; to sell at 30 years' purchase, £337 10s.—X. Y. Z.

[5504.]—**Arches.**—The horizontal thrust at springing would, of course, be equal to a weight or pressure, but as I understand it, the expression "in terms of area," used by Hurst, means only that the sectional area of the arch is used without reducing it to weight, as it simplifies the working of the formula, because in finding the thickness of the abutment its sectional area would have to be obtained, and there would be no use in multiplying both sides of the equation by the same quantity—viz., the length of the arch, or of the abutment, which is the same—and the weight of a cubic foot of the material, which is usually assumed to be the same in the abutment as in the arch.—J. S.

[5505.]—**American Timber.**—If "S." will refer back to my reply to 5477, in BUILDING NEWS of 23rd August, he will see that the botanical name for American white pine is *Pinus strobus*. White pine is the same as that called yellow pine in England. It is a soft wood, but is most extensively used in the United States for joiners' work, and even for carpenters' work, but in this country it will not stand exposure to damp. It is, however, much used in this country for internal doors, skirtings, and the like; it holds glue well, and is almost the only wood used by the pattern-maker, owing to its freedom from knots, &c.—J. S.

[5505.]—**American Timber.**—White pine (*Pinus strobus*) is a majestic tree known to tower to a great height. It is imported from Canada and other parts of North America in logs of considerable length, and up to 2ft. square. It is much used for masts; it is light and soft, texture uniform. It is useful for joinery, but not very durable, being subject to dry rot. It stands the weather tolerably.—D. D.

[5506.]—**Ventilating Cesspool.**—"Doubter" is quite correct in his supposition that a cesspool will not ventilate with one opening only. He can have ocular demonstration of this if he will try the following simple experiment: Into a common wide-mouthed pickle bottle fit a bung, into this put a piece of tube of any kind, about 18in. long. Fill the bottle with smoke from a tobacco-pipe or otherwise; then let him blow across the top of the pipe, and he will find it will not clear the bottle of its smoke. Now, let him repeat the experiment, but previous to doing so, make a hole in the bung, into which a short piece of pipe is put. Now, let him blow across the upper opening, and he will find the bottle clear of smoke, as if by magic. His cesspool should have a similar opening terminating whenever convenient above ground, and a current of air will be established by every passing breeze.—WM. ALLEN DIXON.

[5506.]—**Ventilating Cesspool.**—"Doubter" is quite right in doubting the efficacy of the ventilation he describes. An air-tight cesspool with only one means of escape for the gases by a rain-water pipe cannot possibly become cleansed. The way to accomplish it would be to cause a current of air through the cesspool by making another opening into it, and placing an exhausting top, such as Buchan's ventilator, on the rain-water pipe. At present as much of the foul air escapes through the trap as by the ventilating pipe.—G. H.

[5507.]—**Painting Cemetery Chapel.**—The mode of painting a chapel in which light is abundant is to employ dark absorbent colours, such as a chocolate for the lower portion of walls up to the window-sill. Above this a sombre tone of buff, citrine, or a drab. A decorative treatment might be well adapted if funds permit, but I should certainly advise the employment of a decorative artist of acknowledged taste if anything of this kind is attempted. In the meantime some suitable conventional pattern may be made to run along a string of colour, the window reveals may be stencilled, and a cornice or frieze of subjects or texts introduced. But whatever is done the place and purpose demand the employment of colours of tertiary character, such as greys, sage greens, drabs, or buffs.—ARCHITECTUS.

St. Andrew's Church, Condover, was re-opened last week after restoration under the direction of Mr. Fairfax Wade, of London. The nave has been laid throughout with a flooring of inlaid mosaic by Messrs. W. H. Burke and Co.

On September 2nd the Cannock School Board opened their new schools in Walsall-road, Cannock. The schools will accommodate 220 boys and 220 girls; residences for the master and mistress are attached. About four months ago the board opened a mixed school at Rawnsley, which provides accommodation for 200 boys, girls, and infants, with master's house attached. Both blocks of schools have been built by Messrs. H. and R. Inskip, of Longton, Staffordshire, at contracts of £4,964 and £2,675 respectively. Messrs. Scrivener and Sons, of Hanley, are the architects, and Mr. J. Siddalls the clerk of works of both erections.

The Electric Light grows steadily in public notice, and there is every indication that before long we shall know whether it has a permanent, practical value. The *New York Times* is about to introduce the process into its composing-room. The cost of the gas used there is about £100 a month at present. The cost of the electric light, it is understood, will be only £20 a month, after the first cost—£200—of fitting up.

Our Office Table.

MR. THOMAS BRASSEY, M.P., delivered an address, on Thursday evening, to artisans and mechanics at the School of Science and Art, in the new buildings at Claremont he has presented to the town of Hastings. He urged upon working men the importance of studying the industries in which they were employed in a broader manner than that in which they could look at it from the bench, and mastering the principles upon which the trade itself was founded. He suggested that it might be possible, in the future, to make Hastings the centre of a very important school of art—one which might perhaps develope into such a home of landscape painters as the city of Norwich was a generation or two since. In conclusion Mr. Brassey said one of the great wants of Hastings, still unprovided for, was that of a public library, and it should be considered whether the Public Libraries Act should not be adopted in Hastings. Should it be thought undesirable, however, he thought he could promise that a library would gradually grow up for the use of the community.

THE death is announced of Mr. Robert Boyle, of Glasgow, the inventor of the well-known ventilator bearing his name. Mr. Boyle appears to have been eager all his life in the pursuit of discoveries likely to benefit his fellow-men. From a biography which appears in a Scottish journal we learn that at an early age he was active in the establishment of depots for the supply of pure bread. Later on we read of him as a lecturer on behalf of philanthropic schemes, manufacturing with his own hands the optical apparatus needed for the illustration of his lectures. Another portion of his life was devoted to art, and one picture painted by him—an allegorical representation of the marriage of the Prince of Wales, attracted some attention at the time, more especially on account of the fact that Mr. Boyle was entirely a self-taught artist. At a still later period he devoted considerable attention to explosives for use in warfare, but seems soon to have become disgusted with the usual reception offered by Government to inventors of that class. The later years of his life were occupied in perfecting and introducing to public notice the ventilator which bears his name.

REFERRING to the approaching opening for traffic of Waterloo-bridge, free from toll, the *Echo* remarks that not many, perhaps, survive who remember the hot contest to which the original project of this structure gave rise. The first proposition was to build it of wood until tolls sufficient had been collected to build it of stone. That notion, however, was overruled by the City of London, through whose influence "The Strand Bridge Company" was incorporated with a capital of £500,000, though upwards of a million was, from beginning to end, expended. Mr. John Rennie, who supplied the designs for London-bridge, actually superintended the works at Waterloo. The first stone was laid October 11, 1811, when a block of Cornish granite was laid over an excavation containing gold and silver coins, above strata of gravel and clay, forests of piles, and a substructure from the Craigleith and Derbyshire quarries. In 1816 a special Act of Parliament relating to the structure was passed, reciting that, in memory of a recent glorious achievement, the new bridge should be christened Waterloo; and, on June 18, 1817, two years after "the crowning victory," it was opened by the Prince Regent, the Duke of Wellington, the Duke of York, and a prodigious *omnium gatherum* of noble lords and ladies. Then was the toll imposed, and it may seem incredible in these days that, for nearly forty years, a society has been in existence to obtain its abolition.

THE death occurred at Montague House, St. Catherine's, Guildford, on Saturday week, of Mr. Edward Ward Lower, formerly a well-known architect. For some years, and until the formation of the Metropolitan Board of Works, Mr. Lower held the office of Surveyor of Metropolitan Buildings. He subsequently superintended, for the War-office Department, the erection of the permanent buildings at Aldershot Camp, and was the architect of the Royal Surrey County Hospital at Guildford. In 1855 Mr. Lower published some notes and suggestions on the Metropolitan Building Act. He leaves two sons, the younger of whom was associated with him in business. Mr. Lower was 66 years of age.

THE Corporation of Plymouth own, amongst other property in the town, the theatre and adjacent hotel. A few months since the theatre was burnt down, and the Corporation have had plans prepared by Mr. Phipps for its rebuilding, and invited tenders. At the meeting of the town council the contract with Mr. Samuel Clarke came up for sealing, when a memorial was presented protesting against a greater expenditure than would be necessary to restore the building to its former condition as illegal, and backing this up with counsel's opinion. The town clerk, however, said the contract was now binding, and that the lessee of the theatre could compel its execution, and by a majority of 29 to 9 votes it was decided to affix the corporate seal to the document.

ON Monday night a fire having broken out in one of the cotton mills of Messrs. Barlow and Jones, Limited, Bolton, an opportunity was afforded of testing a system of rendering ceilings fireproof, patented some time ago. This ceiling consists of hoop iron specially prepared and nailed to the joists, like common wood laths. When this is well plastered it makes a ceiling supassed only by heavy and expensive concrete or brick floors. After a number of experimental tests many of the Lancashire millowners adopted this kind of ceiling, but the fire on Monday night was the first test on so large a scale, and judging from the local reports it appears to have rendered good service. The fire broke out in the second floor of the mill, and soon made its way into the third floor. The ceiling of this room was fireproof, and although the fire in this room was most intense for a full hour and a quarter, it could not penetrate into the fourth floor, which contained the most valuable part of the machinery. H. Leigh and Sons, Bolton, are the patentees of the ceiling.

AMONG the side issues raised by the catastrophe off Woolwich, the question has been mooted as to whether the noxious condition of the Thames at Barking and in the neighbourhood may not have contributed to swell the number of deaths. The testimony of some of the survivors to the unsavory condition of the bath in which they were so suddenly plunged is unanimous, and it is certainly remarkable that so many of those who were rescued have died since—no less than 14 out of 130, or more than 9 per cent. It is too much to assert, as some correspondents have done, that sulphuretted hydrogen is liberated in such quantities by the fermentation of the sewage poured into the river as to render the assumption certain that many of those who were on board the Princess Alice breathed the gas and thus died, but it is pretty generally admitted, except by the Metropolitan Board of Works, that the state of the river at Barking is such that if the locality were nearer London it would not be very long endured. The advocates of deodorisation are, of course, again to the fore, with their suggestions for preserving and utilising the sewage, but they have no new arguments worth consideration. Other towns, not privileged as London is to pollute the stream on which they stand, have found ways and means to purify their sewage sufficiently to enable an effluent clear enough for all practical purposes to be obtained, and at no very distant period the capital will have to follow their example.

A CORRESPONDENT has favoured us with a proposition for a combination style. Undaunted by the failure of previous attempts he has, he thinks, discovered the long sought-for solvent of the architectural alchemist. He says he has worked systematically with mediæval architecture, treating it as the Italians did Greek and Roman. He proposes to place the most massive style, the Norman, at the bottom, and the least massive at the top, so we are to have a superposition of Gothic styles in the same manner as the Italian revivalist piled the "five orders" upon one another. The Norman, Early English, Geometrical, or Decorated, Perpendicular or Florid, with additions of French, are to be in this way combined with a high-pitched roof, dormers, and turrets. Our correspondent says the top or last story is to be a combination like the Roman composite, and sends us a sketch which would probably amuse our readers if we could spare space for its publication.

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FOR BURNING BRICKS, &c.,
(Patented in England, France, and Germany),
Effect a Great Saving in Charging and Discharging, an 50 per cent. of Fuel.
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LEGAL INTELLIGENCE.

COMMITTAL TO PRISON OF A BUILDER.—Mr. E. Clarke, a builder, of Pratt's-road, Hackney, was brought up at Worship-street on Wednesday on a warrant under the following exceptional circumstances:—Mr. Clarke, it appeared, had built eleven small houses in Pratt's-road, Hackney, about the commencement of the year, and Mr. Frederick Meeson, surveyor of the district in which such houses are situate, complained that they were not built in conformity with the requirements of the Metropolitan Building Act. Mr. Clarke not having complied with a notice of the surveyor to alter the houses as required, was summoned for breach of the Act. An order was made on the defendant to do the work required, but at the end of two months he was again summoned to the court for non-compliance with the order. He was then ordered to pay certain penalties provided by the Act, and amounting in this case to £25. The money was recoverable by distress, and the officer (Allpress) received a warrant from the court to levy for the amount. He subsequently made a return that he had been unable to discover sufficient goods to cover the amount. By the terms of the order for the payment of the penalties Mr. Clarke became liable to two months' imprisonment, and being now brought up in custody was ordered to be committed to Holloway Gaol (debtors' side) for that term.

Helliwell's Patent System.
Of AIR and WATER-TIGHT GLAZING, WITHOUT PUTTY, and without exposing any outside woodwork to paint, and NEW SYSTEM of COVERING ROOFS.

The fasteners are brass or copper. The peculiar arrangement of the glass covers the whole of the woodwork, and only the small fastener is visible; therefore the roof is indestructible, and outside painting unnecessary. The squares of glass can be easily removed, and the whole taken out and cleaned by any inexperienced person. Breakage is impossible except through carelessness or accident.

The glazing is more air-tight than the old putty system, yet any amount of ventilation can be given.

Old roofs may be re-glazed on this principle, and roofs are covered with slates or zinc on this system.

Extract from BUILDING NEWS: "Mr. T.W. Helliwell, of Brighouse, has recently patented and introduced a new system of glazing and covering roofs, which is certainly superior to anything of the kind we have seen before . . . . and it will, in our opinion, supersede any other system before the public."

Important references and all particulars from the patentee, T. W. HELLIWELL, Brighouse, Yorkshire; and 19, Parliament-street, London.—[ADVT.]

CHIPS.

The county magistrates of Lancashire at the quarter sessions last week empowered the finance committee to obtain plans and estimates from architects for the erection, adjacent to the new county constabulary headquarters at Preston, of offices for the transaction of the legal and financial business of the county. The committee were further instructed to present to the court tenders from builders for the actual erection of the plans they may select.

The Port Glasgow Town Council accepted on Friday the following tenders in connection with the new waterworks' prison:—For pipe laying to Langbank, Mr. Robert Lucas; for the works at Doughlehill, Messrs. D. McBryde and Co.; and for the piping, Messrs. Robert Laidlaw and Co., Glasgow.

The guardians of Hackney Union, at their meeting on the 11th inst., instructed Messrs. Lee and Smith, their architects, to prepare plans of a building for 200 indoor sick paupers, to be erected on the recently-purchased Castle-house estate, adjoining the Hackney Union premises. A motion for inviting two or three other architects to send in designs was proposed, but not seconded.

A new reservoir and waterworks at Blaenanaddu have been opened by the Swansea Corporation. The river Llyn has been embanked for the further supply of the town. The work has cost nearly £100,000 (double the original estimate). Mr. Green was the contractor.

The memorial stone of a new Wesleyan chapel was laid at Carr Colston, near Nottingham, on Tuesday week. Mr. Wright, of Nottingham, is the architect, and Mr. Wood, of East Bridgford, the contractor.

At the last meeting of the Goole Local Board, Mr. E. C. Buchanan Tudor, C.E., the present surveyor to the board, was requested to undertake the duties of registrar and surveyor under the Canal Boats Act for the Port of Goole.

The memorial stone of a Burns monument, which is being erected at Kilmarnock from designs by Mr. Ingram, architect, of that town, was laid on Saturday. The memorial will comprise a museum, to cost £1,450, and to be devoted to the purposes of a museum, and a statue of the poet—the work of Mr. Stevenson, sculptor—to cost £800.

Mr. Somers Clarke, jun., suggests that a model of the ingenious scaffold employed to raise Cleopatra's Needle, showing the stone poised in mid-air, should be placed in the Architectural Court at the South Kensington Museum, where a cast of the monument will shortly be exposed. He also suggests that a model of the combination used in restoring the south wall of the nave of St. Alban's Cathedral to the perpendicular should find a similar resting place.

A new church, erected from the designs of the late Sir Gilbert Scott, R.A., at Guyhirn-cum-Ringsend, near Wisbech, is to be consecrated on Tuesday next, the 24th inst.

The Carlisle Scientific Society and Field Naturalists' Club, visited Burgh Marsh on Friday; among the papers read was one by Mr. Cory on the parish church of Burgh.

On Monday week the memorial stones of a new Primitive Methodist chapel were laid on a piece of ground near the Oval, Hackney-road, London, E. The chapel replaces one near Cooper's Gardens, purchased by the Baroness Burdett Coutts, and will cost £3,000, with school-room; the former will be seated for 400 people, and the latter for 500 children. At the ceremony the flags used in decoration were hung half-mast high as a tribute of respect to the memory of the architect, Mr. Rouse, who was, as we mentioned last week, one of the passengers lost in the Princess Alice disaster.

A new Wesleyan chapel is about to be erected in the village of Knockholt, Kent, from the designs of Mr. Ranger, architect, of Finsbury Pavement.

Memorial stones of a new Wesleyan chapel have just been laid at Nergnis, near Mold. Mr. Ranger, of Finsbury Pavement, is the architect.

A new Primitive Methodist chapel is in course of erection at Purbrook, Hants. Mr. Webb, of Cosham, is the contractor, and Mr. Ranger, of Finsbury Pavement, the architect.

Mr. Harry Hems, of Exeter, has been awarded "honourable mention" for the sculpture and wood-carving exhibited by him at Paris, under classes 17 and 18.

The restoration of the interior of Barton-le-Cley parish church, near Hitchin, which was in a dilapidated condition, has just been commenced. The tender of Mr. Samuel Parmenter has been accepted for the work; the exterior of the building will be aken in hand in February next, and the whole contract is to be completed by July 1st, 1879. The outlay will be about £1,600.

The foundation stone of a new Primitive Methodist chapel was laid at Brampton, Cumberland, on Monday week. The design is by Mr. Potter, architect, of Carlisle, and Messrs. Spratt are the contractors. The cost will be £1,100.

The Whitehaven trustees have under consideration a report received last week from Mr. John Hawkesley, C.E., on the water supply of the town; in it the engineer recommends the erection of a new reservoir at Harris Moir, at a cost of £5,000, for the supply of the higher levels of the town.

The governors of Harpur's Charity, Bedford, received a report on Thursday, the 12th, from a committee, stating that Mr. Foster's tender for erecting the new elementary school for girls had been accepted at £2,520, and that of Mr. Lilley for additions and alterations to the boys' elementary school at £816, and that the works had been commenced.

A scheme of water supply for the town of Caerphilly has been prepared for the local authority by Mr. A. Lundie, C.E., of Cardiff.

Swinton Board schools, opened a few days ago, are built of Dunford Bridge stone, with quoins from Hooton Roberts. The schools provide accommodation for 500 children. The contract was let to Mr. Charles Bower, of Swinton, for the sum of £4,237 15s. The architects are Messrs. Wilson and Masters, of Sheffield.

The memorial stone of a new building at the Children's Home at Edgworth, near Bolton, to be called the Sanderson-Mitchell House, was recently laid. The cost of erection will be £1,200, and the premises will be furnished for 24 girls. Messrs. Parslow and Clarke, of Liverpool, are the architects.

The foundation-stone of a new Wesleyan chapel at Burnham was laid last week. The style is Decorated, and the building will accommodate 780 persons at a cost of £1,300. Mr. A. Lauder, of Barnstaple, is the architect, and Mr. Kilch, of Bridgwater, the builder.

The Stoke-on-Trent Town Council met in committee, on the 5th inst., "to consider the best known system applicable to this borough for dealing with the sewage thereof," and, after considerable discussion, adopted a resolution in favour of a tank system in preference to one of irrigation.

Operations are now in progress at Holyrood for re-roofing the old Royal Palace. The roof, which is now being removed, dates, it is believed, from the year 1671, when the Palace was rebuilt by Charles II. in its present quadrangular form, after a plan by Sir William Bruce. The timbers of the new roof are to be of well-seasoned red pine from the Baltic, while for its outer covering new slates will be used. The work is being carried out under the superintendence of H.M. Board of Works by Messrs. Beattie, builders.

A new Episcopal church at Stirling was consecrated by the Bishop of Edinburgh last week. The church comprises nave, north and south aisles, chancel, organ-chamber, choir, and vestry. It is built of brown stone brought from Bannockburn quarries, the walls in the interior being faced with red brick. The nave and aisles are 80ft. in length, and 51ft. 6in. wide. The architect was Mr. Robert Anderson, R.S.A., Edinburgh. The building is estimated to cost about £14,000.

REVENGE.—North Country Labourer (who has been engaged to dig): "'They that eat alane may howk alane!' These archi'logical chaps never so much as asked me if ah'd tak' anything, and while they're havin' their denners ah' 've found the 'buryin''"—(pockets urn and several flint arrow-heads)—"and they may whustle for 't!"—*Punch.*

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These SLATES are of a grey green tint, [illegible], and made in all sizes. A large stock available for immediate delivery. For further particulars, [illegible] apply to the MANAGER, Clynderwen, R.S.O., Carmarthenshire.—[ADVT.]

Holloway's well-known and highly-esteemed Pills [illegible] directions.

TENDERS.

ANDOVER.—For new 25 quarter malthouse, Weyhill Brewery, for Geo. Gibbons, Esq. Messrs. Rutley and Blackwell, architects:—

Beale	£854

ANDOVER.—For drainage in the Junction-road for the Urban Sanitary Authority. Specification by Mr. Parkes, borough surveyor:—

Eyles	£78 10 0
Annett and Son	76 12 0
Beale (accepted)	76 10 0

ANDOVER.—For sundry repairs at Fyfield Rectory:—

Beale, Andover	£163 12 0

BARROW-IN-FURNESS.—For alterations to Hindpool-road Congregational church, Barrow-in-Furness. Mr. Howard Evans, architect. Accepted tenders:—

Kelsall, George (excavator, bricklayer, and asphalter)	£64 0 0
Bushby, James (mason)	5 14 9
Ormandy, Wm. (carpenter and joiner)	15 10 0
Eccles, Chas. (smith and founder)	45 14 6
Rothwell, William (plumber, painter, and decorator)	120 0 0
	£250 19 3

[Architect's estimate, £257.]

BATTERSEA.—For additions to St. Peter's Vicarage, for Rev. John Toone. Mr. E. Swinfen Harris, architect, 32, Craven-street, Strand:—

Gregory	£1,935
Downs and Co.	1,790
Williams	1,645

BETHNAL-GREEN.—For laundry buildings at the workhouse. Messrs. A. and C. Harston, architects, 15, Leadenhall-street, E.C.; quantities supplied:—

Sansom and Parrish	£3,100
Gough	2,898
Hearle and Son	2,856
Heiser	2,847
Crockett	2,795
Joscelyne	2,664
Sawyer	2,594
Shurmur	2,583
Palmer	2,545
Parker and Evans	2,485
Wise	2,450
Johnson, J. H. (accepted)	2,366

[Architects' estimate, £2,150.]

BETHNAL-GREEN.—For alterations to the Bricklayers' Arms, Collingwood-street, for Mr. Stockton. Mr. Edward Brown, surveyor:—

Impey (accepted).

BEXLEY HEATH.—For the erection of a pair of detached villas on the London Foresters' Asylum Estate, Bexley Heath, Kent. Quantities by Mr. C. R. Griffiths; Mr. W. F. Potter, architect:—

Payne and Balding, Bromley, Kent	£2,570
Woodward, J., Finsbury	2,399
Ayers, A., Bexley Heath (too late)	1,995

[In consequence of the amounts of the tenders exceeding the expectations of the committee, the matter is deferred for the present.]

BRACKLEY.—Lowest tenders for the execution of water works for the supply of the town. Mr. R. K. Barnes, of Manchester, engineer; quantities supplied by Mr. R. K. Barnes:—

For sinking the well 209ft. deep	£1,066
Constructing reservoir	1,093
Building engine and boiler house	668
Supplying engine, boiler, pumps, and iron work for well	634
Supplying pipes and valves	1,472
Carting pipes & cutting trenches for same	211
Laying and jointing pipes	129

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OFFICE: ON THE WORKS, KEYMER JUNCTION

BRADFORD-ON-AVON.—For the erection of a vicarage house for St. Luke's parish:—

Bladwell, J., Bath	£2,145	0	0
Long, F. and W., Bradford	2,010	0	0
Hayward and Wooster, Bath... ...	1,994	10	0
Bishop, Bath	1,950	0	0
Morgan and Lovell, Bath	1,859	10	0
Hill and Gay, Bath (accepted) ...	1,559	0	0
Stevens and Gardener, Bristol ...	1,355	0	0

CITY OF LONDON.—For building 7 shops and warehouses in Jewin-street and crescent on site of Wesleyan chapel. Messrs. Ford and Hesketh, architects, 21, Aldermanbury, E.C.:—

Kirk and Randall	£11,640
Mark	11,604
Downs and Co....	10,637
Conder	10,370
Peto Bros.	10,328
Browne and Robinson	10,292
Scrivener and Co.	10,261
Kilby	10,219
Braid	10,148
Crabb	10,100
Ashby Bros.	10,096

CITY.—For block of warehouse, St. John-street, Smithfield. Mr. Ben Jabberier, architect:—

		Allowance for old materials.
Dickson	£12,995	
Lane	12,993	
Rider	11,488	
Downs	11,450	
Conder	11,430	
Braid	11,400	
Brown and Robinson...	11,398	
Mark	11,183	
Merritt and Ashby	11,125	
Lawrence	10,975	
Sabey	10,860	
Crabb (accepted)	10,685	

CLAPTON.—For shop in Chatsworth-road, Clapton-park, for Mr. Harding. Mr. H. Shaw, architect:—

Stamp and Bewtell ...	£1,087	£65
Jones	1,062	95
Upson	926	25
Shurmur	949	67
Salmon	900	50
Wood	595	60

CLAY CROSS.—For the construction of a cemetery for the Clay Cross Burial Board:—

Tinkler and Mycroft (accepted) £2,155

DUNSTABLE.—For alterations to tramp ward at the union workhouse, Dunstable, for the Luton Board of Guardians:—

Robinson, J., of Dunstable (accepted).

HASTINGS AND ST. LEONARD'S-ON-SEA.—For public baths, &c. Messrs. Cross, Jeffery, Skilled, and Wells, architects, Hastings:—

Ironwork:

Rother Iron Works Company ...	£2,529	14	0
Fraser Bros.	2,263	0	0
Tillotson, J.	2,108	5	0
Moreland and Son	1,971	14	0
Bunnett and Co...	1,875	10	0
Alderton and Shrewsbury	1,863	18	0
Measures Bros.	1,636	0	0
Dawnay	1,627	0	0
Gielgud	1,527	7	0
Shaw, M. T. and Co.	1,500	0	0
Homan and Rodgers (accepted) ...	1,496	0	0
For finishings to skylights to gentlemen's bath:			
Rodda	372	0	0
Hughes	190	10	0
Harman	187	10	0
Cruttenden	171	10	0
Parks	167	12	0
Eldridge	166	0	0
Vidler	158	0	0
Howell and Son (accepted)	152	0	0

HOLLOWAY, N.—Part of Camden Dairy, 377, Camden-road, being required for the premises of the London Street Tramways Company, the external portions of new dairy are being rebuilt by the company. For the necessary internal work the following tenders have been received. Mr. W. F. Potter, architect:—

Pritchard, W. H.	£73	10	0
Hayworth, S.	65	0	0
Macfarlane, D.	52	0	0
Butler, G. W. (accepted)	49	0	0

CARLISLE.—For the carting of ashes, &c., for the Sanitary Authority of the city during the ensuing year:—

Block and Carlyle (accepted) £515

[Lowest tender received. Amount of accepted tender last year, £470.]

LANGPORT.—For works in connection with a new cemetery at Langport, Somerset. Mr. Hall, of London, architect:—

Davis, M., Langport (accepted) £1,185

LEYTONSTONE, E.—For the building of a laundry at the Leytonstone schools for the guardians of Bethnal-green Union:—

Johnson, J. H., Limehouse (accepted) ... £2,366

[12 tenders received.]

LLANSAMLET.—For the addition of class-room, &c., to school premises belonging to the School Board for Llansamlet, S. Wales:—

Evans, Daniel (accepted) £239

LONDON.—For warehouses, Carrier-street, Oxford-street, for Messrs. Deed and Sons. Messrs. Searle, Son, and Hayes, architects:—

Downs and Co. (accepted).

LONDON.—For alteration at Bengal dining-rooms, Birchin-lane, for Mr. E. Roth. Mr. T. P. Ashby, architect, 45, Cornhill, E.C.:—

Builder's alteration:

Jackson and Todd (accepted)	£22	0	0

Pewterer's alterations:

Grimes	120	0	0
Warne	81	10	0
Matthew (accepted)	70	10	0

LUTON.—For the execution of sewerage works in Park Town, and the extension of deodorising works, for the Town Council of Luton. Divided into three sections, viz.:—No. 1. Diverting river Lea, making new water-course, building weir, sluice, retaining walls and bridge. No. 2. Making sewers in Park Town. No. 3. Forming new road from Park-road to Windmill-lane. Mr. W. H. Leete, borough surveyor:—

No. 1.	No. 2.	No. 3.	Total.
Haselgrove, J. W., Luton:			
£1,010 0 0	£1,170 0 0	£793 10 0	£2,974 0 0
Coker, John, of Bourne, Lincolnshire:			
471 6 0	708 6 6	477 16 0	1,657 8 6
Surveyor's estimate:			
500 0 0	690 0 0	232 0 0	1,422 0 0

MARYLEBONE.—For repairs at the Marylebone Stores, Paradise-street, High-street, for Messrs. Hambury and Co. Mr. Edward Brown, architect, 5, Church-street, Spitalfields:—

Salt	£238		
Marr...	192		
Palmer	185		

MERTHYR.—For the erection of a new school at Merthyr Vale for the School Board for Merthyr Tydfil:—

Jenkins, Merthyr (accepted) £2,770

[13 tenders received.]

POPLAR.—For alteration and refitting the Woolsack Tavern, Ida-street, for Mr. Hudson. Mr. T. P. Ashby, architect, 45, Cornhill, E.C.:—

Builders:

Wood and Sleap	£895	0	0
Burton	840	0	0
Stamp and Bowtell	640	0	0
Jackson and Todd	590	0	0

Pewterers:

Warne	135	0	0
Matthews	126	0	0
Browning	117	0	0

Gasfitters:

Dodson	88	15	0
Gardner	86	16	4

Glass writing and embossing:

Hollyer	98	15	0

POPLAR.—For the erection of three houses and shops, No. 137, 139, and 141, High-street, Poplar, for Thomas Rugg, Esq. Mr. E. C. Homer, architect:—

Staines and Son...	£1,622
Boyce	1,577
Shurmur	1,485
Harper	1,475
Judd and Hawkins	1,397
Reddall	1,350
Alexander	1,349
Johnson	1,333
Sheffield and Prebble	1,287

SOUTHWARK.—For repairs, &c., at the Licensed Victuallers' Asylum, Asylum-road, Old Kent-road. Mr. W. F. Potter, architect:—

Hersee, F.	£242	18	0
Pritchard, W. H....	200	0	0
Hayworth, S.	158	10	0
Butler, G. W. (accepted)	128	0	0

SPITALFIELDS.—For alterations at The Marlborough Head, Pelham-street, for Mr. F. Garner. Mr. Edward Brown, architect, 5, Church-street, Spitalfields:—

Marr	£465
Kiddle and Son (accepted)	375

STAINES.—For the erection of a laundry for the Staines Board of Guardians:—

Boyce (accepted) £1,294

STAINES.—For the fitting up of new laundry about to be built for the Staines Board of Guardians:—

Benham and Co., London	£405	0	0
Clements and Co., London	394	10	0
Herring and Son, Chertsey	350	0	0
Rosser and Russell, Charing-cross ...	327	10	0
May, J. and L., High Holborn (acc.)	304	10	0

SURBITON-ON-THAMES.—For making a new road in Surbiton-hill-park for the Surbiton Improvement Commissioners:—

Darwin	£714
Jarvis, J. H.	690
Jones, W. C. (accepted)...	670

TRALEE.—For the laying of pipes, and making of reservoirs, for the Tralee Waterworks Company. Mr. R. Denny, C.E., engineer:—

Healy and Co. (accepted) £6,617 17 0

[A tender for the same works, from Kennedy and M'Elroy, previously accepted by the company, has been withdrawn on account of error in estimate.]

UPPER TOOTING.—For house, St. James-road, Upper Tooting, for Mr. J. Miston:—

Downs and Co. (accepted).

UPPERTOWN.—For the erection of four labourers' cottages at Uppertown, on the Brightwell-park estate. Messrs. Morris and Stallwood, architects, Reading:—

Cox (accepted) £812

[Including a well.]

WOOLDALE.—For the erection of new schools at Wooldale for the Wooldale and Cartworth U.D. School Board. Messrs. Holtom and Connon, architects, Leeds and Dewsbury:—

Accepted tenders:

Kippax, William, & Co., Holmfirth (mason, &c.)	£1,735	0	0
Brown and Shaw, Holmfirth (carpenters and joiners)	530	0	0
Jobson and Son, Holmfirth (plumber and glazier)	98	10	0
Jackman, George, Holmfirth (plasterer)	79	10	0
Pycock, W., and Son, Leeds (slater)	212	0	0
Lawton and Hogley, Holmfirth (painters)	40	0	0
Hoyle, Geo., Dewsbury (ironfounder)	30	0	0
Total amount ...	£2,724	0	0

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THE BUILDING NEWS.

LONDON, FRIDAY, SETEMBER 27, 1878.

RESTORING THE PALACE OF WESTMINSTER.

IT is a serious matter for reflection that a building which has cost three millions and more of national money, which took a quarter of a century to build, and engaged the foremost scientific and architectural genius of the country, should in such a few years have begun to crumble to decay. The fact is not, however, a recently discovered one. The stone selected, after a careful inquiry made by a commission, became a source of some anxiety, even before the structure was finished, and in 1861 a committee was appointed by the First Commissioner of Public Works and Buildings to inquire into the decay of the stone of the new Palace of Westminster, and into the best means of preserving the stone from further injury. Not long ago public attention was drawn to reported settlements of the river front and other parts of the edifice, upon which we commented at the time; the stonework of the pinnacles and other parts were found split in all directions, from the employment of iron instead of copper cramps. And now we have again evidence forced upon us of the serious nature and extent of the rapid disintegration of the stonework of the river front, and other portions of the Palace of St. Stephen's. We may simply say that at present the main frontage towards the Thames is undergoing a process of piecemeal refacing or reparation —a work which has already been some time in progress, and from what we can see is destined to become a general rather than a partial recasing of the façade. Indeed, we observe that the refacing of the river front in its entirety has become a question of funds, that sooner or later the work must be done, and we are informed arrangements have been made to carry out the restoration in a more extensive manner. The failure of the stone is the more surprising when we consider the preliminary care and experimental inquiry bestowed in the selection of the material, and the grants made from time to time for chemical experiments and processes to indurate the stone or to arrest the decay.

In 1838 a commission, including Sir Charles Barry, was appointed, and made a tour of inspection to the various stone quarries in the kingdom. The stones used in the erection of public buildings were examined, an elaborate report was published, in which a magnesian limestone from Bolsover Moor was selected, though for some reason not largely used. Twenty years later, in 1858, decay had gone so far in some of the carved parapets of the Houses that various compositions were applied experimentally, and Sir Charles Barry reported upon them, showing that only one process, that of M. Szerelmey, resisted further attack, and recommending its application "to the external masonry of the new Palace as a specific against all decay." Professor Faraday and Sir Roderick Murchison, both eminent chemists, reported in favour of this process. In 1861 a Parliamentry committee was appointed to inquire into the decay of the stone of the new Palace, and to propose means for preserving it from further injury, and from the report it is gathered that the hardest limestone is an unsafe material for the erection of public buildings where sulphuric acid and sulphurretted hydrogen preponderate in the atmosphere. In 1870 seven preparations were applied to the carved parapet of the Speaker's Court, which was eaten away to an alarming extent, and in the following year we find Mr. Ayrton, in answer to a question, stating that none of the attempts had proved successful, and though Mr. Szerelmey's was considered the best, "it was not to be relied upon for the permanent preservation of the stonework." Mr. Ransome's process—that of saturating the stone with a solution of silicate of soda and afterwards applying a solution of chloride of calcium to produce an insoluble silicate—was one of the chief of the remedies tried, and has, we believe, been found as good as any in checking the progress of decomposition. Various other means have had their trials, and though they have more or less retarded the progress of disintegration, they have all been found unavailing in arresting decay and the peeling off of the surfaces of the stonework. Such being the unfortunate issue of these precautionary measures and experiments the Commissioner of Public Works has seen fit to adopt a more radical remedy—namely, that of cutting out the defective stones and reinserting new ones.

In inquiring into the causes of the decay—due, doubtless, to many causes—we may briefly refer to those parts of the structure which appear to have suffered the most. A close examination of the main fronts has convinced us that in the course of a very short time the larger portion of the river and Old Palace-yard fronts and the inner quadrangles will have to undergo a thorough restoration. Beginning at the base, we find the stone courses above the plinth which is of granite, has decayed to a serious extent, and along the river front the bases of the hexagonal buttresses or turrets are already under treatment by the substitution of new Anston for the decayed stones. The next portion we find mouldering away is the traceried bands of panelling between the main tiers of windows, the enriched parapets and pinnacles, with their finials and crockets. In the Old Palace-yard front we observe the tooled surfaces of the lower surfaces are gradually peeling off; some parts look as if a corroding acid had eaten away the face; this is particularly the case below the weatherings of buttresses, the strings, and other projecting members, the carving, and bosses. The bands of foliage in the corbels of the windows of this front are seriously affected, while the scalework to the ogee cappings of the pinnacles, their crockets, and the cusps of the bands of quatrefoils and other panelling are also more or less eaten away. We find some stones have exfoliated, large pieces of their surface scaling off when tried by the fingers, others have cracked, and extensive fissures, due either to settlement or disintegration and crushing, disfigure the façade on this side. In fact a casual observer may easily discern in every front various lighter patches of yellow stone, and these when examined will be found to be in various stages of decomposition. Mr. Taylor, the surveyor of the Office of Works, under whose direction the present refacing is going on, and who has observed closely for years the progress of decay, has pointed out to us the important fact that the stones which have suffered most are those immediately below the moulded string courses or labels and projecting parts—proving that the moisture is absorbed by these portions and passes down behind the stone. This idea of percolation is corroborated by the appearance of the mouldering surfaces and the fissuring of the stone behind in an inclined fracture. It is also noticed that the upper surface of the ogee label mouldings are not affected so much as the hollow below. It is well known that the decay of stone takes place by chemical or mechanical agencies—by decomposition or disintegration, in other words. In the first process the elements of the stone enter into new combinations with water, gases, and acids, rendering them soluble and liable to give way; in the latter, perhaps the chief cause of destruction, moisture enters into the porous substance of the stone and congeals, and chemically decomposes. Both causes are at work, and it was the neglect of the external conditions under which the stone of the Palace at Westminster was to be subjected that appears to us to have been the chief mistake made by the Commissioners.

It is most extraordinary, however, that the stone the said Commission selected for the Parliament Houses should have been, from some cause hardly satisfactorily explained, set aside for an inferior magnesium limestone. Bolsover Moor stone was selected for reasons we shall give presently, but Anston stone was afterwards used under the recommendation of the same commission for the exterior, although of admitted inferior quality, and the proof of inferiority is found in the fact that the stonework of the portions faced with Bolsover has resisted the action of the atmosphere better. Decay has been acclerated also by neglect in not setting the stones upon their "quarry bed," by the want of care in selection at the quarry, and by the use of those stones which yielded most profit.

We may here briefly recall the salient recommendations of the report. A commission was formed to select the best building stones to be employed, and in 1839 a report was addressed to the Commissioners of Woods and Forests. This report is probably one of the earliest scientific works undertaken by the Government for the advancement of practical architecture. After describing the properties of sandstone and limestone, the report speaks of the mechanical action due to atmospheric causes by winds, rains, and congelation of water absorbed by the stone, and the chemical action of the atmosphere upon the cementing substance of sandstones and the entire mass of limestones. Buildings in this climate, it goes on to say, are found to suffer the greatest amount of decomposition on their southern, south-western, and western fronts, from the prevalence of winds and rains from these quarters. The choir of Southwell Church of the 12th century is instanced as a remarkable example of the "durability of magnesio-calciferous sandstone resembling that of Mansfield," and the Norman parts of Southwell Church, built of magnesian limestone similar to that of Bolsover Moor, are said "to be in a perfect state—the mouldings and carved enrichments being as sharp as when first executed." The keep of Conisborough Castle, also built of magnesian limestone, was reported to be in a perfect state; while, as instances of this stone in decay, the churches of York, Howden, and Doncaster old church, are mentioned. The report also remarks that "as far as our observations extend, in proportion as the stone employed in magnesian limestone buildings is crystalline, so does it appear to have resisted the decomposing effects of the atmosphere—a conclusion in accordance with the opinion of Professor Daniell, who has stated to us that from the results of experiments he is of opinion the nearer the magnesian limestones approach to equivalent proportions of carbonate of lime and carbonate of magnesia, the more crystalline and better they are in every respect. In summing up their conclusions —afforded by buildings of various dates—the Commission point to many varieties of both sandstone and limestone which resist the atmosphere. Amongst these the sandstones of Stenton, Whitby, Tintern, Rivaulx, and Cragleigh, the magnesio-calciferous sandstones of Mansfield, the calciferous sandstone of Tisbury, the crystalline magnesian limestones or dolomites of Bol-

sover, Huddlestone, and Roche Abbey, the oolites of Byland, Portland, and Ancaster, the shelly oolites and limestones of Barnack and Ham Hill, and the siliciferous limestone of Chilmark are mentioned as the most durable. The report concludes in favour of crystalline limestones "on account of their more precise uniformity of tint, their homogeneous structure, and the facility and economy of their conversion to building purposes," and magnesian limestone or dolomite of Bolsover Moor is preferred. It is a singular fact, however, that whereas at Southwell Minster the stone—a magnesian limestone—bears the tool-marks as distinctly now as it did 800 years ago, the same stone used in the Houses of Parliament has seriously decayed. The fact appears to be that magnesia has a great affinity for sulphur, and the sulphurous acid thrown off in smoke has been the main cause of mischief. Lincoln's Inn Hall and other buildings have suffered from the same cause.

Notwithstanding these recommendations we find that a very small portion of the Houses of Parliament has been built with Bolsover stone—namely, that from the granite plinth to the top of basement—Anston stone, a magnesian limestone of a warm yellow colour, being chiefly used for the façades, though not named in the report. Probably this stone was adopted as the labour upon it was considerably less, and the profit in consequence greater. The Parliamentary Committee appointed to inquire into the causes of decay in 1861, added to their report, which is a very valuable one, a list of buildings in which Anston limestone is employed. These comprise the Amicable Fire Office, Fleet-street, built in 1842, in which the stone was found little affected except in the under beds of the projecting cornices; the Record Office, Fetter-lane, where the same stone was found exhibiting symptoms of decay; the hall and library of Lincoln's-inn, built in 1843, where numerous signs of decay appear, especially in parts liable to take up water; and the Museum of Economic Geology, Jermyn-street (1850), where the stonework was found to be intact. It is rather singular also that Portland stone, known to have stood better than others in London, should have been apparently passed over as inferior to Anston, though the greatest oversight in our mind was the neglect of exposure, one of the main considerations in determining upon a building stone. As it is, a great blunder has been committed somewhere in the introduction of a magnesian limestone in a locality the atmosphere of which is charged with sulphurous acid thrown off in the smokiest part of all the metropolis. There appears to us to be no remedy but a thorough refacing of the fronts of this costly edifice, but we hope that decayed Anston stone will not be replaced by the same material again, and the blunder thus perpetuated. The Office of Works are entrusted with the work, and we have confidence that, in the hands of the experienced surveyors engaged, the selection of the stone will receive every attention.

The expenditure necessary to reface with new stone the extensive fronts of this vast building—a by no means improbable contingency—would be something enormous, and must not be estimated in the same manner as the wrought facing of a new building. The work of renovation for the river front, for example, is nothing less than a costly process of cutting out and reinstating every stone in a facade over 900ft. in length. It entails an expensive scaffolding, erected with great care, and will take years to carry out. The question naturally arises, has every preservative solution been fairly tried, and has practical chemistry failed to discover a process which will render the stone impervious to moisture, and thus arrest the insidious action of atmospheric moisture? Up to the present time we must answer this question in the affirmative. The architectural aspect of this failure is no less of serious import not only to the public but to architects. All our stone buildings, from St. Paul's downwards, are more or less in a state of decomposition, caused by the acids of our smoke-laden atmosphere, and time will aggravate the evil. We may judge for ourselves of this fact. Is it not, therefore, the duty of the profession to restrict to the utmost all architectural ornamentation and carving in the exterior of our public buildings rather than to add to the burdens of a future generation? The lesson is an important one for architects to consider. No one can doubt that the excessive panelling and intricate ornamentation of the Houses of Parliament was a costly and artistic blunder. Is it worth while to decorate excessively at such a risk? Does such work even artistically justify its cost? A river poet some time since sang as follows with regard to the fearfully and wonderfully entangled inscriptions which appear at intervals on the river front:—

"I am certain, without question, in a fit of indigestion,
The architect devised those scrolls, whose language is unknown."

The prospect of a piecemeal renovation of such minute details is enough to produce something more serious than mental indigestion in the mind of any future architect entrusted with the task.

ARCHITECTURE IN THE CITY.

SOME of the leading City thoroughfares show fresh signs of activity, and if we take Cheapside for our present purpose we may see what commercial prosperity has done during the past few years. The time was not long since when Cheapside contained hardly a new building of any pretension, whereas now we may reckon a score of new shops and public offices that compete in cost at least with any at the West-end. As might be expected the Eastern end has advanced the most, for here at the embouchure of Cheapside or its junction with Broad-street, Cornhill, Lombard-street, King William-street, and Queen Victoria-street, have arisen a group of costly piles which vie in pretension with the Bank and Royal Exchange. It is a pity, indeed, at this great city focus of traffic the ædiles of City improvement did not form a spacious circus worthy of the great arteries which now run together at every conceivable angle, adding vastly to the obstruction of vehicular traffic and the danger of pedestrians. One of the chief evidences of improvement, however, that we notice in Cheapside is the rectification of the lines of street and a widening of contracted parts—a step that may be followed by the widening of such tributaries as Bread-street, Gutter-lane, Foster-lane, and Old Change. There is a great need of reformation in the tortuous streets and lanes of the City where a narrow gullet or entrance often leads into a wide thoroughfare. At the eastern end of Cheapside—the Poultry—as every one knows, there was a narrowing of the roadway by a considerable projection on the north side, which formed a kind of throttle to the continuous flow of traffic. At such a centre as this, so near to the Mansion House, Bank, and Exchange, the consequence is often a complete congestion of vehicles and pedestrians. Between Princes-street and the Old Jewry the block of buildings has been set back and Mercers' Hall is undergoing a considerable lopping off of its frontage line, together with the adjoining property between Old Jewry and Ironmonger-lane. We notice that the old vestibule of Mercers' Hall is cut through by the new line of frontage, and the coloured Doric pilasters and ceilings of that building are worth a glance. The hall itself will not be interfered with, and from the area already cleared of old houses, we should say there will be a valuable strip of frontage to dispose of at this part.

It is from Princes-street to the Old Jewry that the principal buildings have been erected. These are principally shops and offices. White brick and stone, stone, stucco, and glass form the chief materials of these fronts, for we have no evidence of any other portions of them. In style we have different versions of what may be termed the mercantile—and gimcrack Italian. In one instance the design is so whimsical and bizarre that we cannot call it architecture at all—we used to have something of the sort in iron gates twenty years ago: to endeavour to define it more exactly is impossible. We notice mezzanines but indifferently treated—an attempt at a corner entrance in which the mouldings are kept extremely flat; and, *à propos* of the attempt, it is a question whether projecting cornices are the right things in streets so narrow where there is a struggle for light and air. One stone front has a very unsatisfactory entresol, in which an effort is made to round the corners of the head, but the effect is weak in the extreme, and the mass of piers and small windows above appears to rest very uncomfortably upon the weak shoulders of the two lower stories of plate glass. Cheapside seems to be a favourite street for mezzanines—a not surprising requirement in cramped thoroughfares, but we cannot say we have seen an instance that is really a success.

One building, of more commanding frontage and elevation than many others in the Poultry, is the Gresham Life Assurance Offices, from the designs of Mr. J. J. Cole, recently noticed by us (p. 621, Vol. XXXIV.), which being now completed, externally at least, and the scaffolding removed, displays its proportions and detail to greater advantage than it did at the time of our previous remarks. Its proximity to several important edifices—such as the Mansion House, the Safe Deposit Company's Bank, &c.—enable one to judge of the work with some degree of moderation, a task that would be impossible if it were situated in a crowded street of ordinary buildings. The architect has produced a strikingly bold and emphatic-looking structure, that holds its own. One of its chief recommendations, to our mind, is that it is plain and unfrittered away by the pilasters and subdivisions our street architects love so much. There is a manly unaffected dignity in the front which is vigorous and healthy when we compare it with the laboured Gothic row of shops on the opposite side. The centre, with its three orders of disengaged columns of polished Peterhead granite, is sufficiently prominent to make a feature, though not so much so as to cause an obstruction or to make us think the architect had been throwing away valuable space in so crowded a street. The semicircular-headed windows of the first floor, with their polished granite pilasters, afford a pleasing break in the lines, though, perhaps, a connecting string at the imposts would have helped to bind together the work. We are disposed to question also the rather weak effect of the angle pilasters to the canted corners, and the continuation of the Corinthian foliage above the narrow lights between the capitals on the ground story at the corners. The entrance doorway is now surmounted by a massive projection of the cornice, supported on carved stone consoles, and the effect is only marred, to our eye, by a little redundance of the surface carving, by the squat caps on which they rest, and by the awkward bits of Corinthian capital which appear at the external corners, and die up against the red granite pilasters of the lower

order of the entrance. One peculiarity we observe is that the soffit of the corbelled door-head is of massive red granite, below which, and between the consoles, a bold bed-moulding of ovolo form, carved with oak leaves, is placed. It is a point worth mention here, and pointed out to us by the architect, that the granite used in the pilasters are not merely slabs of the material fixed to the front like the jambs of boxed chimney-pieces, but real solid square pillars; the detached piers, we are informed, go 4ft. 6in. through to the inside of the walls, and perform the duty of supports themselves. Another peculiarity to be observed is that all the cornices have polished granite friezes, and they aid in connecting the parts of the façade. Combined with the pilasters and the centre quadrangular dome of stamped copper-plates, there is a pleasing harmony of colour in the materials that at present—till, at least, the smoke shall have subdued the freshness of the work—adds to the appearance. One of the best views, we think, of this building is obtained from the Mansion House.

Passing up Cheapside on the other side, we see a new block of offices of red granite and stone, the granite being used in entablatures and small pillars, which divide the front. The idea of placing ornament upon the polished granite friezes as we see here, and the extremely coarse and vulgarly proportioned stone capitals and details constrain us to declare that the less of this kind of art we are treated to the better. Bow Church steeple, we notice, is surrounded by a lofty scaffolding for repair, and this grand tower is, after all, still the greatest feature in Cheapside. On the west side of Bow Church the street architecture displays a curious farrago of hybrid styles of which it would be difficult to speak in commendation, and yet with which it is hardly worth while finding fault. We allude more especially to a group of three or four recent fronts on the south side. The London Stereoscopic Company, next to a thin corner house of strip-like proportions, is an example of a plate-glass elevation set in a light framework—one cannot honestly call it built. A few doors further up we have an extremely sensational group of fronts, one occupied by Lake and Turner, and another by Messrs. Keith, Prowse, and Co.—the latter displaying a capricious or nondescript dress of Gothic—a piling up of chimerical detail, which appals by its extravagant steep-stone dormered roof. In Bread-street, a door or two down, is a new front in a kind of Flemish Gothic; the upper stories of stone, and the mezzanine, are a step towards improvement.

The new premises for Messrs. T. Foster and Co., the wine and spirit merchants, promise an attempt at a sober amendment of some of these sensational productions. The façade is of stone, and of large frontage, the leading character of the elevation being a series of pilasters comprising two or three stories, with a recessed fenestration between. In one block we see three vertical bays of windows, above the cornice an attic story, in which there are four narrower lights divided by smaller pilasters, which latter, of course, do not stand over the lower ones. This block is to be let out as shops and offices. Messrs. J. and W. Wimble, of Queen Victoria-street, are the architects.

While it would be useless to expect much pains to be bestowed upon houses that are of short leasehold tenure, we cannot but regret to see so much of the trumpery façade manufacture—it is certainly not building—displayed in so many City erections. A huge scaffolding, closely boarded below, conceals from view, for a few weeks at the most, an interior composed of nothing but timber floors and partitions between a couple of party walls. The passer-by can plainly behold every part of this frail erection; at last, a few bricklayers and masons appear upon the scene, and in a week or two a front of stone, replete with architectural members, pillars, cornices, and windows, shuts out from view the void behind. Often this is a mere screen of stone slabs full of window openings, in which the solid portions occupy seldom more than one-third and the voids quite two-thirds of the whole front. Shall we call it "street fronting?" It is certainly not building, much less architecture.

So far as mercantile architecture is concerned, Cheapside has not worthily maintained the position it holds in the commercial world. Many other thoroughfares in the City have surpassed it. We have some doubt whether a mercantile establishment improves its position by the erection of prodigious plate-glass fronts in a Brummagem style, and in this respect many of the leading West-end streets, like New Bond-street, offer an opportune contrast; but the exigencies of trade are vastly different in the two localities, and there is a great deal to be said on the score of light. Still, if the mercantile mind could be brought to regard substantial art as not the least evident criterion of a successful business, it would be so much the better.

THE CHURCH OF SAN ZENO, VERONA.

THE position of this church, as regards the city of Verona, may be taken as a type of its relation to Italian ecclesiastical architecture generally. It stands within the walls, yet so completely isolated from the body of the city as scarcely to seem a part of it; and just in the same manner does it seem to hold aloof from the rest of Italian churches, even of its own style and date. There are few churches in Italy that are in themselves so entirely worthy of honourable admiration as this. It has no long rows of costly elaborate tombs piled along its walls—it does not boast the suggestive grandeur imparted by the faded hues of frescoes—it displays not overhead the golden sheen and sunset colours of glittering mosaic; nor has it even a surpassing richness of sculptured detail, but there is in the building itself a beauty, simplicity, and dignity rarely found so thoroughly united, and so entirely unclouded by additions and after-structures.

San Zeno is of the Early Lombard style, having been built between the years 1138-78. It is in plan a basilica, with aisles, but no transept, and at the east end a choir raised above the level of the nave floor by a vaulted crypt below. This choir is approached by flights of marble stairs occupying the width of each aisle. It is chiefly built of the fine grey coarse-grained marble known as *bronzino*, because of the musical sound it emits when being wrought. This is, in places, judiciously varied by a salmon-coloured marble—the Veronese red—and in the tower and at the flanks of the church by courses of mellow-toned red brick. The main features of the front are a great wide gable of low pitch, crowned by a deep coping, and two lean-tos, similarly finished, which butt against it lower down. The coping of the gable is almost dignified into the raking cornice of a pediment by a horizontal string-course carried across the front, but a little below the point of junction. Both in the string-course and in the copings is introduced the small semi-circular headed arched corbel-tabling, which is so beautiful and characteristic a feature of the style. The division of the main gable from the wings is emphasised by a semi-hexagonal pilaster or buttress, which runs up as far as the horizontal string-course, these being finished by a carved cap, but supporting nothing. The wings are quietly and tastefully divided into perpendicular compartments by flat attenuated pilasters, which run from plinth to the raking coping, and then are surmounted by carved capitals at the springing of every third of the small corbel-table arches. Half-way up the elevation a broad line is carried across the entire front, formed by a series of small narrow double-light openings, of which only one pair on each side are really lights. These are unmoulded, but have one slight shallow reveal, and for mullions have two slender detached shafts with united caps and bases, upon which the puny semicircular heads meet. These openings are cut out of a band of the salmon-coloured marble, so that the line across the front is rendered more marked. The porch is thoroughly Lombardic in character, and consists of a simple unmoulded semicircular arch, with a very deep soffit built against the front, rather than part of it, and supported upon two slender shafts standing at some distance from the wall. Above the arch is a low obtuse gablet of the same pitch as the centre gable, and finished with a lightly-moulded coping. The arch has a sort of narrow archivolt, formed by the alternation of pateræ and figures in low relief, with smooth-surfaced voussoirs. Its soffits are richly inlaid with a wonderful variety of sculptured slabs, as is also the tympanum above the square-headed door opening. In this latter the central figure is an effigy of the saint trampling on a prostrate demon; evil thus conquered, the victor uplifts his hand in blessing, and beneath his benediction all must enter the church. At the narrow springing of the arch we see the favourite Lombard device for reminding us of the duty of bearing our various burdens. Two squatting figures, with heads thrust forward, seem to support on their shoulders and uplifted arms the whole weight of the arch and gablet above them. They sit on the abaci of the capitals to the shafts, which are a derivation from the Corinthian, and possess a good deal of lightness and beauty. But if man's burden be somewhat wearisome, he takes care to guarantee as large a share as possible to the lower animals; and this, too, is indicated, for the bases of the shafts bear heavily on two crouching grotesque lions, which, with hollow backs and folded limbs, are turning their heads towards each other as if in sympathy. Again, above the burden-bearing men at the angles of the gablet stand boldly upright, as if emancipated from labour, two full-length figures, their heads just touching the under side of the slight coping-moulds. At each side of this porch, and extending to the hexagonal buttresses, are a series of Early bas-reliefs in large panels, framed by styles enriched with rough but vigorous scroll-work and pateræ of different devices. Those at the right as you face the door seem to set forth the creation and fall, including a singular embodiment of the old distich "When Adam delved and Eve span, who was then the gentleman?" Adam is wielding in both hands some gardening implement, his back bent double with the labour, whilst Eve, fully attired, is seated by his side with her spindle.

The lowest of the reliefs on this side is supposed to be the only now remaining relic of Theodoric in this City, in which he built himself a castle. The emperor is represented as seated on horseback, stirruped and with spear at rest, whilst the stag he is pursuing figures in the next panel, hard pressed by the hounds. The reliefs on the left represent the Redemption and other New Testament scenes, whilst Theodoric's hunting scene is balanced by an equestrian combat. These reliefs form a sort of sculptured dado as high up as the course of small double-light openings above described. The eye of the design of the front

of the church is, like that of Polyphemus, in its forehead, being a great wheel window of very quiet and beautiful proportions. There are many wheel windows of one sort or another in Italy, but this is one of the most pleasing and satisfactory of them all. Very often in this feature a certain beauty of detail is more than counterbalanced by an unskilful introduction into the design of which it forms a part, a restlessness thereby being apparent, as though the wheel ought to be in motion. Frequently, too, this defect is emphasised by an abrupt commencement of delicate and somewhat "bizarre" tracery, according ill with the masses of plain wall surface forming the field in which the window is generally sunk. Here in San Zeno there are none of these defects. The outer framing of the wheel consists of a flat broad fillet of the same width and projection as the attenuated pilasters, into which it merges where they come into contact. Within this there are three unmoulded lines of reveal, sharp, broad, and shallow, which form the frame, and let the eye gradually down into the tracery. Even then the solidity does not unduly break away into delicacy, for the tracery—if such it may be called—consists of plain semicircular heads, which centre round the slight double-shafted spokes. Of these there are twelve, the circle being diametred perpendicularly and horizontally, and they are collected in the centre by a ring of stone which forms the axis. This ring is a charming admixture of strength and grace. It is perforated on the inside with a delicate garland of small semicircular cusps, re-duplicated and reduced from the outermost heads. One thing that seems to impart to this beautiful window that restfulness which so entirely characterises it, is that it does not stand, or rather roll upon a stiff horizontal string-course. The course which does, so to speak, carry it, is slightly higher than its circumference, and therefore has to dip with its sweep, thus making a natural bend or cup in which the window finds a rest for itself. The side walls of the church are divided into bays by semi-hexagonal pilasters similar to those in the front, but placed at wide intervals. The cornice at the eaves is a very fine and typical one. The upper moulds are severe and shallow; the frieze is formed by a continuous course of surface-relief scroll ornament; and then below occurs again the arched corbel-table. The small heads of this last are relieved by the incision of a running ornament of the same character as that in the frieze, and a wonderful sense of richness is given thereby. The whole cornice—for beauty of detail, for the due proportion of its parts, and for general refinedness of taste—is as delightful a design as can be conceived. The clerestory is formed of stern, isolated, narrow, round-arch openings, deeply splayed, and having but a single roll mould at the arris. The flanks of the church, as has been mentioned, differ from, and are made to appear subordinate to, the front, by the introduction of alternate courses of red brick. These are of a rich dark tone of colour, and, with the bronzino, form a quiet combination that is most pleasing in effect.

At the hinder end of the church, really distinct, but shabbily united by some low sacristy building, towers the glorious campanile. Stern, without being harsh—graceful, without being weak—it lifts vigorously up its two hundred feet against the blue sky. This tower is the oldest existing portion of the edifice, dating from 1045, but having been restored a dozen years or so before the nave and front were rebuilt. It rises four-square up to the point where it is covered by the high conical roof or low spire of dark-red moulded tiles. For three-quarters of its height its wall surface is unbroken, but variety is produced by the same alternation of bronzino and red brick in courses as at the flanks. These do not, however, run all round; were this the case, the effect of solidity would be lost; but are stopped at the angles by very wide, very slightly projected pilasters, which, like angle piers, continue up the whole height until they find an inside arris where the windows are. Thus the colour—the angle piers being of bronzino—is confined within these two perpendicular lines on each face of the tower, and is further subdivided by a long narrow pilaster, and horizontally into various very deep stories by string-courses, with the ever-recurring corbel-tabling. One thing noticeable about these strings is that as they get nearer to the top they increase in width. The first and second from the ground have only one very narrow course of brick on edge between the corbelling and the string-course. The third has two wider rows introduced, and the fourth, which also serves as a sill-course for the windows, has three rows of similar work. The windows which occupy the fourth quarter of the height, just beneath the conical roof, extend over the space between the angle piers, the line of which they thus perpetuate up to the point where the tower is capped, and where the four pinnacles finish them. These openings are in two rows of identical design. Three semicircular heads—that in the centre of slightly smaller radius—meet on two light shafts; they, as usual, have no mouldings but a narrow line of reveal, the outermost arches being executed in a very narrow course of red brick, as though the designer had taken his brush and margined it with colour to bring out the whiteness of the inner ones. The two ranges of lights are separated by a deepish bit of wall-surface, and here the architect has dashed in with apparent picturesque capriciousness two narrow courses of red brick, with most telling effect. The pinnacles at the angles are the least satisfactory feature. They are square, and capped with a conical finish of red tiles, but are much narrower than the angle piers, which they seem, however, intended to cap. They have the appearance of being an unskilful after-addition; nevertheless, when you do not examine them too closely, but look at them merely as part of the tower outline, they so much enhance the effect as to make you sensible that pinnacles of some sort were essential.

Upon entering the church, and standing on the platform of steps that leads us down to the level of its pavement, the general effect is really "good"—something abounding perfectly in order, in harmony, in all that satisfies man's sense of beauty. The nave is spaced out by solid and stately piers, against which half-round pillars are planted on the four sides, those turning towards the body of the church continuing up the nave walls, and those at right angles serving as imposts to the nave arches, which are semi-circular. There are two of these arches between each set of piers, and the central springing is borne—and borne with a beautiful balance—by a single polished pillar of salmon-red marble. Thus, all down the church you have a variety of alternate massiveness and elegance, wonderfully pleasing. The capitals to the piers are very simple, being merely unsculptured merging of the square form at the abacus into the round at the astragal, with a flat leaf laid on at the angles. Those to the single pillars are quite a study. Their designs are very various, and their outlines are very subtle and sufficient in the way they gather the broad weighty arches upon themselves, and convey them down to the comparatively slender pillars beneath. As is usual in the sculptured work of the period, animal life enters largely into their composition. Full-bodied lions in some chase each other round the angles, over, and through conventional foliage. In others, crouching human figures convulsively keep themselves from falling backwards off the corners by impartially grasping at leaves on either side of them. The excellence of these capitals is not quite uniform, and especially in the two on the right as you enter a weaker character prevails. These are a feeble imitation of the Corinthian, minus the volutes, and being leaner both than the springing and the pillars, appear very insufficient for their work. As you stand near the entrance, and look down the noble perspective of pier and pillar and arch, the glance is arrested three-quarters of the way along by a gulf of descending steps, and by the upper part of a façade rising out of it. This consists of three most graceful semi-circular arches, delicately enriched with a running incised ornament by way of an archivolt. These fill up the width of the nave, and bear above them a line of marble balustrading. This façade serves two purposes: it is a screen against which to stop the higher floor of the choir beyond, and it is the entrance to the vaulted crypt below, which reveals itself in a charming vista of slender pillars through the round framing of the arches. The balustrade is made up of slender shafts, with square newels at intervals, which serve as pedestals for statues of saints or apostles. This is executed in the red marble while the arches below are in bronzino. Behind the choir lengthens itself out into an apse of pointed work, dimly closing up the background. This is the least interesting part of the church architecturally. Above the piers and nave arches, which are of bronzino, the brick again is introduced in alternate courses, and the great masses of wall surface are broken only by the stern openings of the clerestory windows. The floor of the church is paved with marble in large diamond shapes, and the effect is broad and sheeny, and without the belittlement of patterned mosaics. One feature noticeable in the style of the church, both inside and out, is the almost entire absence of mouldings to the arches, and yet the absence also of the lifeless bareness one would expect to result from such treatment. Every semi-circular arch in the building, from the large ones in the nave to the diminutive ones in the corbel-tabling, has the same single sharp-edged reveal. The only attempt at relieving this is the instance mentioned of the incised scrolls round the crypt-entrance arches, which is finished by an outer line with a cut block ornament, and bears a slight resemblance to the Roman archivolt.

The roof of the nave is a very curious feature of the church, and, though neither beautiful nor constructionally truthful, it nevertheless closes over the solid dignity of the interior with a quiet sombreness by no means inharmonious. It is of wood, and the prevailing colour is a blue grey. From a long array of brackets on the walls, the ribs spring on each side in a quarter-circle cove until they meet the tie-beam, and then rise in another semi-circular cove above it, thus leaving it exposed in the centre. According to the custodian the tie-beam is the lowest constructional timber used, and the coving below is simply planted on for ornament's sake. The roof is boarded in, the ribs being small, but so frequent as to suggest a resemblance to corrugated iron. The aisles are closed at the ends by the spacious flights of marble balustraded steps which lead up to the choir. A door to the left, after ascending, gives admittance to a beautiful cloister-court of semi-circular arcading. As a finishing survey of the church it more than repays one to visit it again at night-time, and my own farewell to it I shall not soon forget.

A. R. G.

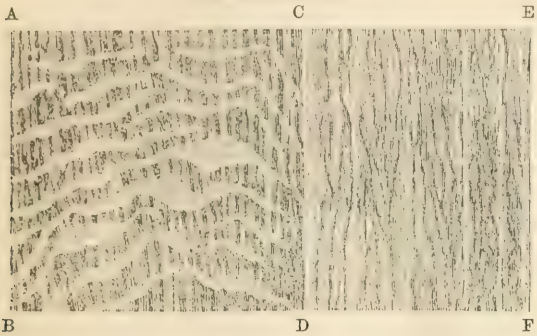
A CHAPTER ON SOME KINDS OF TIMBER.—II.

THE oak is available to the engineer, builder, and mechanist, for a wider range of application than other native trees. It best serves for defence, and bears exposure. For furniture it is in high esteem, and has pre-eminence for artistic carpentry and churchwork. Nothing can well seem stranger, therefore, than that a material of such general and familiar presence should be subject to doubt and confusion with another. Were the conflict so equally supported as that between Robur and Sessiliflora for supremacy in quality and pretension to the name of "old English oak" it would be reasonable, but it falls to the level of caprice when *chesnut* becomes the competitor. "A few years since," says Mr. Johns (1847), "it was generally believed that the beautiful carved roof of Westminster Hall was constructed of chesnut; recent examination has, however, proved that it is composed entirely of Durmast oak"—*i.e.*, Sessiliflora, but of a species (Quercus pubescens) that is only sparingly met with, and of very inferior quality. This Durmast theory is, therefore, in all probability of no higher authority than the statements met with in guides and text-books concerning the chesnut; and only in a less degree delusive and deserving to be stamped out!

The question has attracted the serious attention of architects, and the transactions of the Institute include papers by Mr. Wyatt Papworth and Mr. Blashill. The latter has treated the subject graphically; and although his novel and forcible method is singularly inconclusive where most relied on—that is, for establishing an obvious distinction between oak and chesnut—it admirably demonstrates the varied appearances oak itself assumes. Take, for example, a stem; remove the bark and clean the circular face (or, without much change, it may be reduced from the cylindrical to a square figure), and the appearance will be as A B C D in the annexed diagram. But if the log be cut diametrically and the inner surface exposed, the markings of the silver-grain and all the characteristics command immediate recognition as at C D E F. Such, be it remembered, are the differences of oak, and oak indeed of one and the same piece. But between A B C D and a corresponding surface of chesnut there would be no distinguishable contrast; though had Mr. Blashill produced a representation—and it is to be regretted that he did not—I should have done him the homage to pirate his labour.

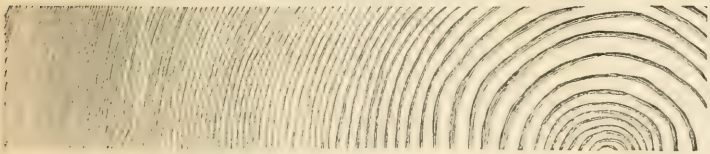
The flowery variegation that is an element of beauty, and for which pollards are esteemed, is unvalued in the ruder works of carpentry, and more manageable material is preferred. The typical grey-brown often gives way on such accounts to the foxy-red of swampish origin, or the darkened tone of bad subsoils; but both are signs of a perishable nature. Thus, for the saving of labour, inferior often takes the place of better wood; but for elaborate productions, where endurance is in view, the architect's preference must still be given to perfect British oak, without a strained regard to the refinement of botanical discrimination.

STEM OF AN OAK.



Appearance of Outer Surface. Appearance of Radial Section.

PINUS SYLVESTRIS—YELLOW FIR.



Cross Section showing Annual Layers.

The last three centuries have witnessed a complete revolution in the consumptional aspect of this material. At the beginning of that term all the iron smelted at home was by means of charcoal. Mineral fuel was still held in abhorrence for domestic use. Oak was the prime and general material used for building, but is now almost totally superseded. In shipbuilding it has to a great extent become obsolete, and the general tendency is such as to warrant the supposition that imports of this wood will ultimately cease. The wood that has so greatly superseded others as to be the almost universal material in modern work belongs to the order *Coniferæ*, the fruit being produced in the form of cones, and varying in size from half an inch in Abies Canadensis to a couple of feet in Pinus Lambertiana. Plants of this order are mostly evergreen, with needle-shaped leaves, that have occasioned the German names *nadlehhobz* and *tangelhobz*. On the natives of mountainous tracts in high latitudes the leaf measures less than an inch and a half, while in Pinus Australis it is twelve times that length. The wood has a resinous constitution, whence the terms of Greek derivation Pine and Picca, allusive to its fat or pitch-producing quality. The French have *Pin* and *Sapin*. The Roman appellation *Abies* denoted the loftness of some species. The great combustibility of the substance seems to be remembered in our common word Fir, descended from the British Fyrr, Danish Fyr, and Saxon Furh. Cæsar's exclusion has been abundantly overruled as far as Pinus Sylvestris is concerned, and this species is at the head of the entire class of soft white woods, both for useful qualities and extensive application. Roman roads are known to have been made through woods of fir, and trunks are discovered both at the sides and under them. Mr. Johns writes: "Tradition favours the Pine's being considered a native forest tree of England as well as of Scotland." Gerard, he tells us, says: "I have seen these trees growing in Cheshire, Staffordshire, and Lancashire, where they grew in great plentie, as it is reported, before Noah's flood, but then being overflowed and overwhelmed have been since in the mosses and waterie moorish grounds, very sound and fresh until this day, and so full of a resinous substance that they burne like a torch or linke, and the inhabitants of those countries do call it Firre woode and Fire woode unto this day."

Strutt observes that "of all the numerous tribe of pine or fir trees, the Pinus Sylvestris, or real Scotch fir, is the most prized for the value of its timber. When it arrives at a full age its wood resembles the Laburnum in colour, and is nearly as hard. The fir in Dunmore Wood, Stirlingshire, the property of the Earl of Dunmore—perhaps the largest in the Lowlands of Scotland—is fully as remarkable for its beauty as its magnitude, affording a very pleasing specimen of the characteristic form of its species. It is 67ft. in height, 11ft. 3in. girt, at the ground, and 10ft. 3in. at 17ft. from it. Its age is not known, though that of the fir in general may be ascertained by the grain of the wood, which appears distinctly in circles annually formed from the centre to the bark." This I can illustrate by the cross section of a plank, obtained as a rubbing, and therefore exact. This section shows the time required for the growth of a tree, and the changes in the rate of increment, which are not the least noticeable feature. They agree with the observation that "a fir for the first half dozen years seems to stand or at least to make no considerable advance; but it is when thoroughly rooted that it comes away miraculously."

It commonly attains a height of 90ft. in as many years, and a diameter of 18in. The wood is of a pale honey tone, and there being no transverse septa the figure seen in boards is due to the accidental sections of the yearly layers. These impart a pleasing, subdued variety, sometimes permanently retained by polishing, sizing, and varnishing the surface. In young trees the proportion of sap is considerable, but this gradually assimilates with the heart wood when maturity is reached, and the weight, after seasoning, is about 34lb. per cubic foot. For durability it was held by Brindley equal to oak in all situations, but this is scarcely so, for although much used in the fittings of ships, it does not well bear actual immersion in sea-water. Sir Robert Seppings stated, in 1796, that frigates built of Baltic fir would last eight years; but those of American wood not half so long. Oak would surely far surpass them both. Fir performs, however, innumerable duties. In forest-covered lands trees of 6in. to 12in. are flung almost

wantonly in lines to form the jolting "corduroy roads;" and from such coarse purposes the material may be traced to the most carefully executed examples of carpentry. Glue is hardly germane to that art, but it effects a strong union, and the wood is so well adapted for carving that Saint Luke is said to have used it for his figure of Saint Mary of Loretto.

SOME EXPERIMENTS MADE AT THE ROYAL OBSERVATORY, KEW, UPON VENTILATING EXHAUST COWLS.*

EXHAUST cowls, as already explained, are self-acting appliances for exhausting air from buildings, sewers, &c., and derive their action from the wind passing across or through the cowl, and thereby causing a partial vacuum. There are a great number of these exhaust cowls, and great results are claimed for them by their makers; but, so far as the author is aware, very little information of a reliable character, based on scientific trials, is in existence.

At the Exhibition of Sanitary Appliances, held at Leamington last year, under the auspices of the Sanitary Institute of Great Britain, several of these exhaust cowls were submitted, and it was decided to take advantage of the opportunity to make scientific tests on these cowls. These experiments were carried out by a committee, who intrusted the practical details of the arrangements to the author. The committee was composed of the following gentlemen:—Captain Douglas Galton, C.B., F.R.S.; Rogers Field, C.E.; and William Eassie, C.E. The Kew committee of the Royal Society allowed the experiments to be carried out at the Royal Observatory, Kew. The cowls submitted for testing were the "Air-Pump Ventilator" of Messrs. Boyle, the "Injector" cowl of Messrs. Scott Dunn, and the Dutch cowl of Mr. Lloyd. The cowls may be considered among the best types of cowls, and represent the fixed principle without any moving parts, as in the "Air-Pump Ventilator" and the Dutch cowl, and the revolving principle as shown in the "Injector" cowl.

The "Air-Pump Ventilator" is composed of vertical plates, so arranged round a cylindrical form as to weather. The action of the wind passing across the plates forms a partial vacuum, and causes the up-current. The principal dimensions of the air-pump cowl, as used in these experiments, are as follows:—Diameter across the plates 18in., height of plates 19in., number of plates 20, and the height over all 46in.

The "Injector" cowl is composed mainly of two cones, one placed before the other, and contained in an outer cone. This outer cone is placed with its axis horizontal, supported on a pivot properly balanced, and has vanes or wings on either side. The wind blowing in any direction causes the mouth of the cone to turn to that direction, and, rushing through the inner cones and passing across the upright shaft, causes a partial vacuum, thus inducing the upward force. The principal dimensions of this cowl are 31in. over all, main cone 18in., and 12in. front diameter; the inner cones are 9½in. and 4in.

The Dutch form of cowl, lately patented in England by Mr. Lloyd, is of similar form to the cowl used by Captain Lieurnur, of Amsterdam, and has no moving parts; it is also of small diameter, which may be of advantage in some instances. This cowl is composed of two conical rings, set apart with an aperture 5·8in. wide, surmounted by a conical drum, and having a flat plate across the top to exclude weather. The dimensions are as follows:—Diameter 12in., top plate 15in.

The building in which the experiments were carried on was the Experimental House at Kew Observatory, which was conveniently situated in an open space. The building was of wood, and through the roof iron tubes were fixed, upon a horizontal platform at the ridge of the roof. Another platform immediately below this was also made to facilitate the fixing and removal of the cowls. These iron tubes were 6in. in diameter, 12ft. long, and projected out through the roof about 2ft., leaving about 10ft. within the building. The lower ends of the tubes inside the building were fixed to a wooden bench. To admit air equally to the mouths of the tubes a long narrow aperture was made in one side of the building, and at the time of the experiments all windows and doors were, of course, shut. Four upright 6in. tubes were fixed about 5ft. apart, centre to centre, one for each cowl, and one to be tried without any cowl, and simply as a plain open tube. The open tube was eventually chosen as the standard with which to compare the cowls, as it was found that a very considerable upward current was induced in it by the wind passing across the orifice, and bore a large ratio to the velocity of the passing wind.

The apparatus used for these experiments was a Robinson's cup anemometer, 4ft. diameter from centre to centre of cups, and having its dial or index within the building. Four 3in. air current meters, of the improved Loune's construction, one under the mouth of each tube, and placed on a suitable table supported from the bench before mentioned. Covering pieces of zinc were made to reduce from the 6in. iron tubes to the 3in. air current meters. The four current meters were actuated by two operators, by means of wires, so as to start and stop the instruments simultaneously. The time was taken for each experiment from a chronometer, and the temperatures within and without the building were carefully ascertained at the time of each experiment. The direction of the wind and its variations were taken from the self-recording diagrams at the Observatory.

The apparatus being fixed the four open plain tubes were first tried without any cowl being fixed on them, and the operation was as follows:—Three operators were employed—one took the anemometer, chronometer, and thermometer readings, while the two others attended the four current meters. The current meters were all started and all stopped at one moment on the word being given from the operator at the chronometer. The usual interval of time in these experiments was from five to ten minutes. All the readings were carefully booked independently by two persons, so as to insure accuracy.

The experiments on the four open tubes revealed the fact that the upward current was different in each, no two being exactly alike. In order, therefore, to insure an accurate comparison between the open tube and the cowl, the cowl to be tried was placed between two open tubes, and the upward velocity of the cowl shaft compared with the mean of the velocities in the two open shafts or pipes. The cowls were also placed in various other positions, and tried with reference to each other.

The result of the experiments is given in the following report of the sub-committee to the Council of the Sanitary Institute of Great Britain:—

The sub-committee appointed at Leamington to test the ventilating exhaust cowls beg to report that they have given the matter their most careful attention, and carried out at the Royal Observatory, Kew, an elaborate series of about 100 experiments on seven different days, at different times of the day, and under different conditions of wind and temperature. After comparing the cowls very carefully with each other, and all of them with a plain open pipe, as the simplest and, in fact, only available standard, the sub-committee find that none of the exhaust cowls cause a more rapid current of air than prevails in an open pipe under similar conditions, but without any cowl fitted on it. The only use of the cowls, therefore, appears to be to exclude rain from the ventilating pipes, and as this can be done equally, if not more efficiently, in other and simpler ways, without diminishing the rapidity of the current in the open pipe, the sub-committee are unable to recommend the grant of the medal of the Sanitary Institute of Great Britain to any of the exhaust cowls submitted to them for trial.

W. EASSIE.
ROGERS FIELD.
May 30, 1878. DOUGLAS GALTON.

At the conclusion of the experiments invitations were issued to the scientific public to visit and inspect the arrangements at Kew Observatory, when demonstrations were given of the methods adopted in carrying out the experiments, and this communication is made as a permanent record of what was then explained. The results already attained with open tubes are so remarkable that it would be very valuable were further observations on different forms of tubes carried out. Arrangements have, therefore, been made for this purpose, and a sum of money subscribed to enable the sub-committee to pursue their investigations in that direction. Any information bearing on the subject will be thankfully acknowledged by the institute.

* Translation of paper read by Mr. J. WALLACE PEGGS, C.E., at the Congrès International D'Hygiène, Paris, August 10th, 1878.

ENGLISH ROYAL ART RELICS ON THE CONTINENT.

IN an interesting letter to the *Times*, on "Old English Decorative and Industrial Art," Mr. J. C. Robinson says:—

"Nobody would expect to find the coronation robe of one of our Plantagenet kings among the regalia of the old German Empire at Vienna, yet such a venerable garment is really there preserved, and a very beautiful thing it is. It came there in this curious way: About the middle of the 13th century, at one of the elections for the Imperial dignity, a successful candidate was an English prince—Richard of Cornwall, brother of King Henry III., better known as Richard, King of the Romans; for, at all events, amid the wild turmoil of the electoral struggle, that title was legally conferred on him. To get himself duly crowned at Aix-la-Chapelle was Richard's first care, but there were serious difficulties in the way. Moreover, in those days the visible symbols of anointed Majesty were all-important and indispensable, and apparently crown, sceptre, and imperial mantle were in the hands of Richard's enemies. To get over this dilemma messengers were despatched in hot haste to London, where King Henry, like a good brother, opened his royal closet at Westminster, and lent his own regal ornaments for the occasion. Richard's sovereignty was, after all, but a barren and ephemeral one; yet the curious evidence of it in the shape of the royal mantle aforesaid still remains, and that it is no sham relic is shown by the fact that the rich crimson velvet robe is diapered all over with the broom flower and its pods, 'Planta Genista,' the well-known badge of the Plantaganet kings.

"Not less interesting is another Royal relic, preserved, curiously enough, at Aix-la-Chapelle. This treasure I had myself the good fortune to identify some years ago. The treasury of the Cathedral at Aix, it is well known, is one of the most magnificent in the world. Among its priceless gems is a golden crown or coronet, richly enamelled and set with pearls and jewels—just such a one as may be seen sculptured on sepulchral effigies, or depicted in numerous 15th century pictures and illuminations, but of which I know no other actual specimen remaining. It was a lady's coronet, and it bears, on a narrow band around it, an inscription denoting it to have been the gift of 'the Queen Margaret.' The canons of Aix supposed this to have been the French Queen Marguérite of Navarre, who lived during the early part of the 16th century; but a single glance sufficed to show me that it must have been made perhaps a hundred years earlier. The style was of pure and elegant Gothic, doubtless English, and when I perceived that a leading motive of the ornamentation was a number of little white gold-enamelled daisies, there remained no doubt in my mind as to who was the donor, for the white daisy, 'Marguérite,' was the well-known emblem of the luckless Margaret of Anjou, Queen of Henry VI. Who now shall tell in what special moment of tribulation during Margaret's Continental exile this votive offering was dedicated?"

GROOVELESS TRAMWAYS.

WE have lately devoted some space to tramways, and the improvements being made in the mode of laying the iron rails, especially with reference to the point admitted to be of vital consequence—namely, the damage to and wear and tear of ordinary vehicles from the ruts formed between the metals and the pitching. A correspondent (Mr. Dixon) has lately called attention to the subject, and suggested a flange bottom or bed-plate to the rail upon which the "sets" can be laid. A similar method, however, is in use at Manchester, by

which the settlement of the paving is prevented. We have now before us a description of a "grooveless tramway," patented by Mr. Charles Allarton Edge, architect, of Birmigham, who has laid down an experimental quarter of a mile of line upon this system. We may briefly describe Mr. Edge's invention, in the absence of a diagram, as a tubular rolled-iron rail, the top plate of which is bedded level with the roadway, and is perforated at intervals with round holes, into which corresponding studs, fixed to the tires of the car-wheels, enter as they travel. "These studs," says the patentee, "are so arranged that as the vehicle travels they enter the holes on the rails, and thus keep the wheels on the track much more effectually than the flanged wheel and grooved rail now in vogue." The great advantage of the method is that it avoids the evil we have complained of—namely, the danger of ordinary carriage wheels entering the grooves and ruts of the present tramways. Another advantage claimed is that there is no groove to clean out, as in the existing tramways, where labourers are employed to keep the grooves clear from stones and dirt, and the inventor points out that in his system "the passage of the car itself effectually clears out the holes, and the rail being level, all other impediments, by a simple operation connected with the car, can be brushed off. To receive the fragments of stones and the accumulation of dirt falling through the holes, the rails are fixed on cast-iron chairs placed over a hollow foundation, forming a continuous channel, which can be connected at intervals with the sewers, and will thus form a channel for the removal of surface water from the roadway." The rail plates can be easily unscrewed from the chairs for the purpose of clearing out, though it is believed such clearance would not be often required. Mr. Edge anticipates two objections we certainly had in view when we first looked at his new rail. The first is the liability of stones getting wedged into the holes in the rail, and so throwing off the car. This, we are told, has been found not to interfere, as the weight of the car itself is sufficient to crush any such impediments immediately upon contact with the steel studs. We know, however, that some of the stones in the grooves of ordinary tramways are not so agreeably overcome. The second objection is that of the wheels occasionally slipping along the rail, and thus becoming derailed in descending steep gradients and rounding sharp curves. The inventor recommends swivelling the axle of the front wheels instead of fixed axle bearings, in order to reduce friction. It is evident also that unless there is great accuracy in the fitting of the studs to the holes friction will ensue. The author has invented a screw-action brake to press against the sides of the wheel-tires of the four wheels. As regards cost, we are informed that the rail, whether of steel or iron, need not be heavier than the present, and the brick and concrete foundation would, it is thought, not be more than wood sleepers and cross-ties. The rails are reversible. We prefer the rectangular section, No. 3 or 4 in the drawings given. The rails of Mr. Edge's experimental line are of cast iron, the wheels are of cast steel in one piece, including the studs, but hardened steel studs that may be fitted and screwed to a wrought-iron or cast-steel wheel are advocated. The inventor exhibits a full-size model in the carriage department of the British section of the Paris Exhibition.

DISINFECTANTS AND DEODORANTS.

MR. THOS. TAYLOR, microscopist of the American Department of Agriculture, gives the following as the result of some recent researches:—"During the year 1876 I made a series of experiments with essential oils, including the oil of eucalyptus globulus and the spirits of turpentine, which were published in the report of the Department of Agriculture for that year. I found that the oil of eucalyptus disinfected fresh meat as effectually as carbolic acid, besides being a powerful deodoriser, and on combining it with soap found it agreeable, forming a valuable substitute for the carbolic, especially for the sick room. Turpentine I found to be also a powerful deodoriser. A tablespoonful of the latter, added to a pailful of water, will destroy the odour of cesspools instantly, and in the sick chamber will prove a powerful auxiliary in the destruction of germs and bad odours, being both a disinfectant and deodoriser. I have quite recently added to the list of disinfectants one of general application, and it has for many purposes the advantage of cheapness with remarkable effectiveness. I allude to gasoline, one of the products of petroleum. Gasoline, when applied to the germs of fungi or of other cryptogamic plants, instantly destroys them, although it fails to deodorise gases. Being a solvent of oils and fats it destroys animal germs, and fatty degeneration gives way to it. It may be employed full strength to wash delicate and tender plants and sores without producing pain. It is wholly devoid of the caustic principle; even when applied to the tongue it produces no disagreeable sensation. A single drop applied to any insect will kill it, and even its vapours have a most destructive effect on the lower forms of animal life. When gasoline is applied to a wound or to any delicate part of the body, on evaporation it produces the sensation of cold, followed soon after by a sensation of heat. Of course all experiments should be made in the absence of artificial light, as it is a very explosive gas. Articles sent by post supposed to be infected can be thoroughly disinfected by the application of gasoline, either by immersion or by sponging the surfaces. It penetrates with lightning rapidity all porous substances, such as leather, gloves, bank notes, ribbons, dress goods, silk, cotton, and linen, evaporating in a few minutes without injury to the goods. I have placed sealed letters in this solution for a few moments, completely wetting the contents, and in less than five minutes the gasoline evaporated, leaving the letters dry, without stain, and well disinfected."

THE ANCIENT CAPITAL OF ULYSSES.

DURING an enforced absence from his cherished work in connection with the exploration of the Trojan district, which, however, he has once more been allowed to recommence, Dr. Schliemann has been devoting his attention to Ithaca, the island kingdom of Ulysses. His opinion is that the usually accepted idea that the valley of Polis is the site of the Homeric capital of Ithaca, must be definitely abandoned. He afterwards carefully surveyed the remaining northern part of the island, but found only in one spot the ruins of any ancient town, which he is inclined to identify as that mentioned by Scylax Per. 34, and Ptolemæus III., 14, 13. A careful exploration of Mount Aetos, situate on the narrow isthmus, hardly one mile wide, which connects northern and southern Ithaca, resulted in the conviction that in the same manner as the Acropolis of Athens was widened by Cimon, who included a large portion of its north-eastern slope and filled up the lower space with stones and débris, the level summit of Mount Aetos was extended to the north and south-west by a huge cyclopean wall still existing, the space between the top and the wall being filled up with stones and débris. Thus the summit forms a quadrangular even platform 166ft. 8in. long, by 127ft. 4in. broad, so that there was on the summit ample room for a large mansion and a courtyard. To the north and south of the circuit-wall are towers of cyclopean masonry, from each of which a huge wall of immense boulders runs down. But at a certain distance these two walls begin to form a curve, and ultimately join together. Two more cyclopean walls run down from the top—the one in an easterly, the other in a south-easterly direction, and join the curve formed by the two first-named walls. "Lastly," says Dr. Schliemann, "I have to mention a huge circuit-wall about 50ft. below the upper circuit-wall. This wall has fallen on the west side, but is in a marvellous state of preservation on the other sides. To increase the strength of the place the foot of the rock has been cut away so as to form a perpendicular rock wall 20ft. high. In the walls are recognisable three gates. Between all those cyclopean walls once stood a city, which may have contained 2,000 houses, either cut out in the rock or built of cyclopean masonry. Of 190 of these houses I have been able to find the ruins more or less well preserved. I measured 12 of them, and found them between 21ft. and 63ft. long, and 15ft. to 20ft. broad. The usual size of the rudely cut stones is 5ft. in length, 4ft. 8in. in breadth, and 2ft. in thickness. The size of these stones by far exceeds that of the stones in the cyclopean houses I discovered at Mycenæ and Tiryns. Some of the houses consisted of only one room; others had four or even six chambers. From below not one of the houses is visible, and as the Ithacan peasants thought them to be mere heaps of stones they did not point them out to foreigners, who might ascend Mount Aetos a hundred times without noticing any one of them, for the slopes of the Aetos ascend under an angle of 35deg., and they are thus by 7deg. steeper than the cone of Mount Vesuvius; therefore, it is exceedingly difficult and fatiguing to ascend Mount Aetos, the more so as it is full of pointed rocks and overgrown with thorny underwood and thistles. Besides, the path by which the peasants lead strangers to the top does not pass near any of the better preserved cyclopean houses; it passes only a few foundations, in which even the best archæologist may fail to recognise remnants of houses unless he has seen the better preserved buildings. For all these reasons even Col. Leake only saw 'some terrace walls and some foundations of buildings on the side of the Aetos;' and from this remark of his no man could have expected to find here the more or less well-preserved ruins of 190 houses of Ithaca's most ancient capital. This cyclopean capital is unique in the world, and every admirer of Homer ought to come out to see it."

A few fragments of pottery, and the remains of a curious handmill, were the only results of a fortnight's exploration of these cyclopean remains, and similar bad luck attended a careful examination of the stalactite grotto near Dexia or Phorkys, where Ulysses is said to have hid his treasures, assisted by Pallas. Near the south-east extremity of the island, 4½ miles distant from Vathy, are a number of stable-like rooms, averaging 25ft. in length and 10ft. in breadth, partly rock cut, partly formed by cyclopean walls of very huge stones, in which Homer must have seen the 12 swine stables built by the divine swine-herd Eumæus. To the east of these stables, and just in front of them, thousands of very common but most ancient potsherds indicate the existence of an ancient rustic habitation, which Homer appears to have described to us as the house and station of Eumæus.

COMPETITIONS.

LEEK.—The competition of designs for the new fever hospital at Leek has at last, we understand, been settled, the committee being assisted in their award by the architect to the Local Government Board, with the following result:—1st premium to Mr. Huckvale, architect, of Tring; and the 2nd premium to Mr. Smith, architect, of Leek.

NOTTINGHAM.—Yesterday, the 26th inst., designs were sent in to the Nottingham School Board for the second school to be erected by the board. The site of the new buildings is in Hunger-street, and the accommodation is to be for 1,020 children. The arrangement is on the class-room system. The competition bids fair to be rather strongly contested, and two or three very good names figure among the competitors. Another school has also to be built in Baldwell Quarry-road for 400 children.

The foundation stone of a new vicarage at Folkestone, was laid on Tuesday, by the Primate. Mr. Ewan Christian is the architect.

Last week a general meeting of the creditors of Mr. Geo. Mallinson, architect, Dewsbury, was held. The statement of affairs read to the meeting showed liabilities amounting to £1,848 2s. 2d., the assets available being but £150. As the debtor had no offer to make, the meeting resolved to wind up the estate in liquidation.

It has now been decided that the construction of the Forth Bridge will be commenced on the 1st of October. The contracts for the bridge have not yet been accepted, but Mr. John Waddell, contractor, by whom the tunnel through Dock-street, Dundee, and the erection of the Tay-bridge Station was carried out, has been instructed to begin preparing the foundations. It is expected that the structure will be completed in four years.

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OUR LITHOGRAPHIC ILLUSTRATIONS.

DRAWING-ROOM, "FAIR OAK," NORTHENDEN.

THE walls of this room are hung with Messrs. Watt and Co.'s (of Baker-street) blue damask paper in panels, and the whole of the woodwork and dado, &c., is painted white. The furniture is made of rosewood and cedar, with silver mounts, the upholstery being covered with rich figured silk, supplied by Messrs. Jackson and Graham. The carpets for this and the other principal rooms are Messrs. Morris and Co.'s manufacture, and the curtains Messrs. Corolishaw's. Messrs. Bell and Roper are the architects of the house and the furniture for the principal rooms, the latter being made by Messrs. Kendal, Milne, and Co., of Manchester.

ST. MATTHEW'S CHURCH, SYDENHAM.

OUR illustration of this church is taken from the successful drawings sent in by Mr. J. Edward K. Cutts, under the motto "Fides," in competition with five other architects. A description of the drawings will be found in the BUILDING NEWS, May 31, 1878.

WOODSIDE, SEVENOAKS.

THIS house has been erected on a site within about an acre of land, being a portion of property belonging to P. S. C. Brewer, Esq., in Bradbourne Park, in a pleasant outskirt of Sevenoaks which is being gradually worked out in plots for building moderate-sized houses, with various areas of garden and pleasure grounds. The two plans will explain the arrangement of ground and first floors; and there are three bedrooms on the second floor, making six in all. It need only be remarked that the drawing-room, with verandah and balcony, being placed on the first floor, was determined partly by the desire to provide all the offices on the ground floor without extending the building, but chiefly to obtain a fine view, which is not so well seen from below. The perspective sketch is taken from the north-west. The corridor, the western front up to the base of the gable, and the chimney-stacks are built of red bricks and Box Ground stone dressings, and the balcony and verandah of wood. The superstructure is built with 14in. brick walls, finished with rough stucco in raised panels, which is of the lightest possible tint of greenish grey, while the plaster spaces between the timbers of gables are the purest white. The adoption of this treatment was the result of the design having been originally made to be worked out as a concrete house, which was abandoned through the difficulties and delays which were found to stand in the way of that mode of building—the external effect of which, however, it was desired to retain as being very satisfactory and pleasing in its general appearance and harmony of colour. The roofs are covered with red tiles. The work has been executed by Mr. J. G. Naylar, builder, of Rochester, from the design and directions of Mr. Wm. Milford Teulon, architect, of 18, Upper Woburn-place, W.C.

MUNICIPAL BUILDINGS, GREAT YARMOUTH.

WE illustrate this week the selected design for the new municipal buildings, Great Yarmouth, sent in under the motto "Beacon" by Mr. John B. Pearce, architect, of Norwich. This design, placed first by the Corporation of Great Yarmouth, was also the first to attract our attention, and to receive notice in our critical article on the plans on page 1 of the present volume. The plans may be considered as divided into two distinct departments—viz., the municipal and the magisterial. The former of these is entered from the Hall-plain, and consists on the ground of a large central hall, round which are placed the various rooms appropriated to the borough officials, and the ladies' and gentlemen's cloak-rooms, together with a hall-keeper's room and the requisite lavatories and other offices. From the central hall a spacious staircase leads to the assembly-room, with a card-room, supper-room, and refreshment buffet en suite, and a smoking-room and gallery for orchestral purposes, easily accessible. The magisterial department is quite distinct from the municipal, although in communication with it. The entrance to this department is from the east; right and left of this entrance are rooms for the barristers, solicitors, and witnesses, and opening out of an inner hall are w.-c.'s for the public. A wide easy staircase leads from this hall to the courts, which are on the first-floor. The courts have separate doors for the public and officials, and every care has been taken to prevent confusion and disorder in the conduct of business. The prisoners for trial in the petty sessions court will be brought up by a direct staircase from the cells to the dock, and in the quarter sessions court, where this arrangement is not practicable, a turnkey's lobby with a private staircase is provided, accessible from the cells by crossing the hall of this department. A judges' retiring-room is provided in communication with the quarter sessions court. There are two spare rooms between the courts on the first-floor, the larger of which, opening into the petty sessions court would make an admirable retiring-room for the magistrates; w.-c.'s for the court officials are provided also on this floor. The second-floor is appropriated to the grand and petty jury rooms, with w.-c.'s, &c., en suite, and arranged so as to be entirely shut off from the rest of the building. A gallery is provided in the quarter sessions court. The hall-keeper's living-rooms and kitchens are on the second-floor, and occupy the central portion of the south side of the building, his bedroom being above. A separate entrance is provided on the south side, in Hall-square, for tradesmen, and to give access to the above rooms, and beneath this portion of the building are arranged the coal-cellar and heating apparatus room, the floor of the store-room and w.c.'s on the ground floor being kept on a slightly higher level to admit of this. The ventilation of the various rooms will be chiefly effected by the arrangement of the windows, fireplaces, &c., but a special means of ventilating the courts and assembly-room will be provided by using Verity Bros'. patent air-propelling ventilators, which is, according to Mr. Pearce, the simplest and best invention extant for securing this object. The various rooms will be warmed by open fireplaces, but provision is made for the staircases and corridors, &c., being warmed with coils of hot-water pipes from an apparatus placed in the basement. The walls throughout to be built of brick, faced externally with Bath stone. The floors of the principal halls and corridors to be laid with marble mosaic paving; the lavatories, &c., to be paved with encaustic tiles, and the walls lined with white glazed tiles. The staircases to be all of white Portland stone, with ornamental iron balusters. The roofs to be constructed of the best fir, and covered with Bangor slates, the gutters, ridges, hips, flats, &c., being of milled lead. The whole of the joiners' work to be of thoroughly-seasoned wood, the doors, windows, and fittings in the principal rooms to be of wainscot oak, and in the remaining rooms of thoroughly-seasoned deal. The walls and ceilings throughout to be finished in plaster, the enrichment being in plaster or carton. The whole of the fittings of lavatories, w.-c.'s, &c., to be Jennings' patents. The drains to be of glazed earthenware pipes, jointed in cement. The courts and assembly-room to be lighted with sunburners; the remaining rooms and staircases with gaseliers of appropriate design. A boiler to be fixed in the basement, with flow and return pipes to hot-water coils in the halls, corridors, &c. Verity Bros'. patent air-propelling ventilators to be fixed in convenient positions for the ventilation of the courts and assembly-room, and to be connected with the outer air by properly-constructed flues.

DETAILS OF EARLY IRONWORK.

THE sketch of large hinge at Notre Dame is carefully reduced from a full-size drawing (two sheets imperial) made from a cast; parts of the hinge are in very considerable relief. The other sketches do not pretend to exact accuracy. The iron scrolls at Southwell are applied to the exterior of the door, the hinges proper being inside; the treatment of curved bands is continued down from top to bottom. The gates at Lincoln, although large, and consisting of such a simple repetition, are particularly pleasing and effective.—W. R. LETHABY.

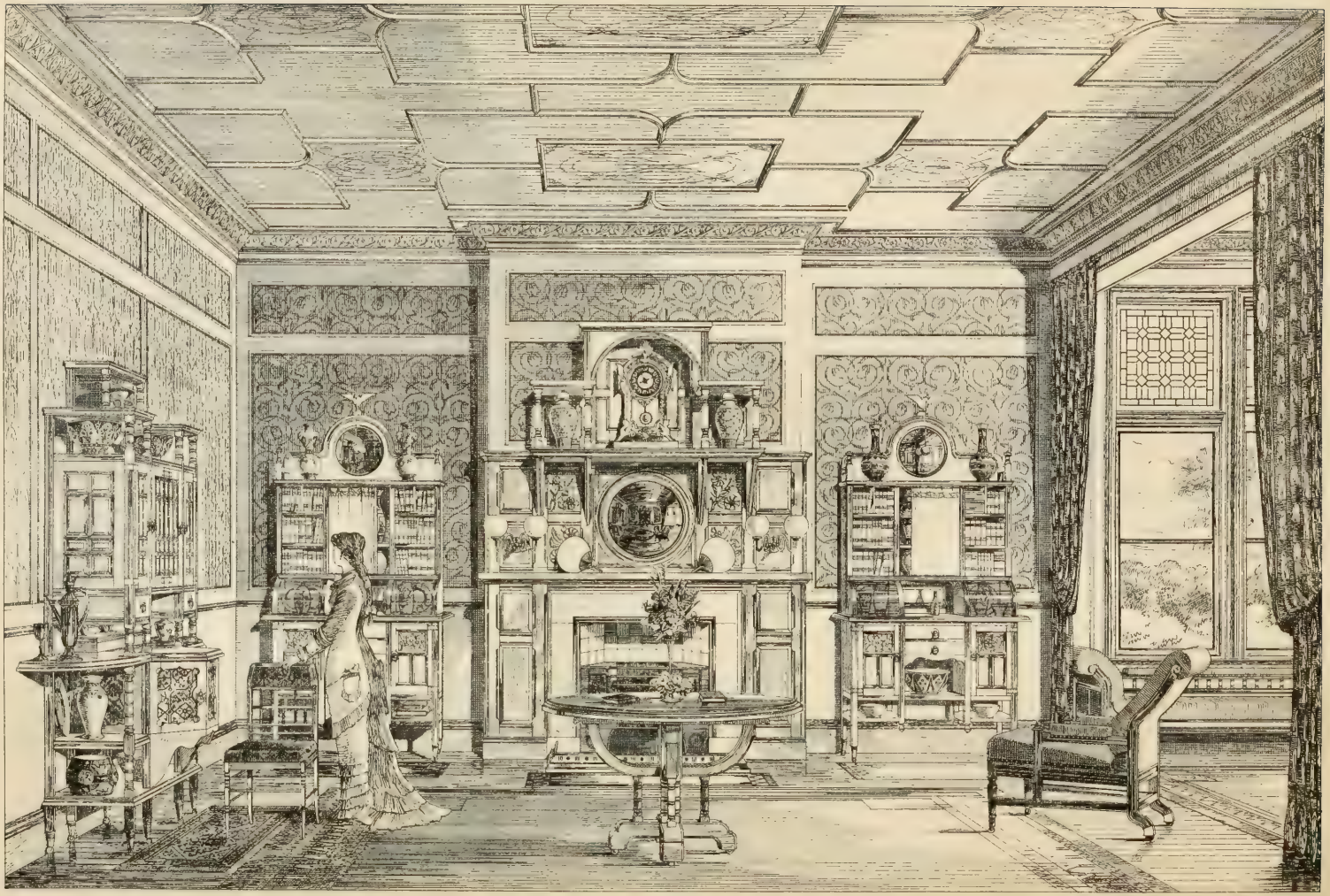
ARCHÆOLOGICAL.

ARCHÆOLOGISTS ON RESTORATION AT DURHAM CATHEDRAL.—The Durham and Archæological Society visited Durham Cathedral on Thursday week. The members are reported to have been greatly scandalised by the alterations effected during recent years. The screen, the pulpit, the reading-desk, and the pavement were not only denounced as bad, but were, curiously enough, declared to be "out of place." A Mr. Longstaff said these alterations had been carried out at an enormous expense, and he considered it had been a great waste of money. However, the members might congratulate themselves that the architectural arrangements of the building had not been interfered with, and he hoped that by the next century the whole of these so-called improvements would be swept away. The Latin cross on the top of the screen he regarded as very offensive and totally out of keeping with the minster generally. The architect to the London School Board severely criticised the screen as too massive and strong, and more like three arches of a building than a cathedral screen. Such a feature was essentially a piece of furniture, added after the work of erection, and ought, therefore, to be of a light and ornamental character. Mr. Longstaff condescendingly added that the people of the nineteenth century had a perfect right to have a style of architecture of their own, but he thought that the next century would see the whole of these additions swept away—an inconsistent anticipation surely from an advocate for the preservation of every jot and tittle of historical evidence.

OPENING OF THE CASTLE ARCHDALE TUMULI.—Two of the most important tumuli in the deer park at Castle Archdale, county Fermanagh, were broached on Saturday week, under the direction of Mr. Wakeman, F.R.Hist.A.I. A magnificent dolmen was unearthed, composed of stones, on which are carved spirals, lozenges, zigzags, and other Ogham-like scorings. One of the carved symbols is that of a hatchet set in a handle and surmounted by a plume. This emblem, though not uncommon in Brittany, has never before been noted as occurring in an Irish "giant's chamber." In the second mound an unburnt skeleton was found, lying amongst partially-cremated bones. Castings and rubbings are to be made of all the carved stones.

SCHOOLS OF ART.

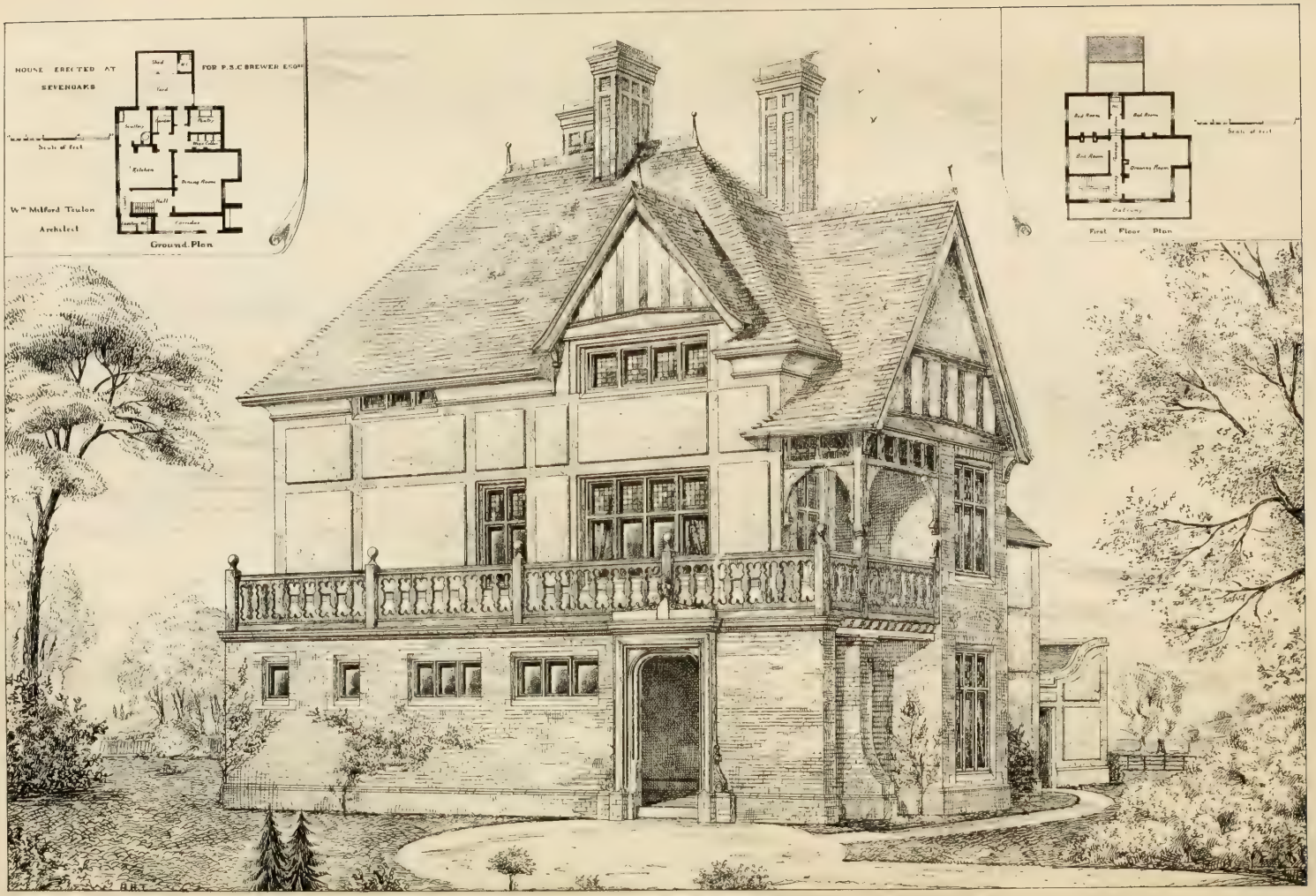
FALKIRK.—A new science and art school was opened on Saturday. The new building, which is two stories in height, has been erected in Italian style, its chief features being a pilastered doorway and a balcony with balustrades below a large double-light window on the second floor. The interior has been divided into a series of rooms, in which the different branches of education will be taught. Arrangements have been made whereby day as well as evening classes will be carried on in the new building. Mr. Wright has been appointed head-master of the art school; Mr. R. Macaulay is to take charge of the chemistry classes, while those for mathematics and mechanics will be conducted by Mr. Charles G. Dewberry, M.A.



Phot. Lithographed by Bolton and Co. Queen Square W.C.

FAIR-OAKS NORTHENDEN Drawing Rm

ASAHEL P. BELL & G. FREETH ROPER ARCHITECTS

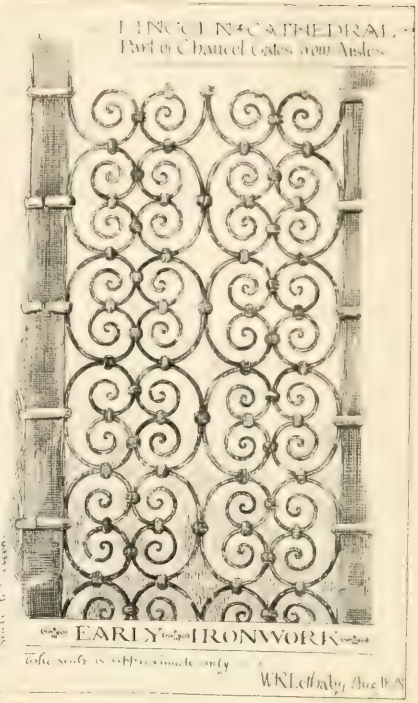


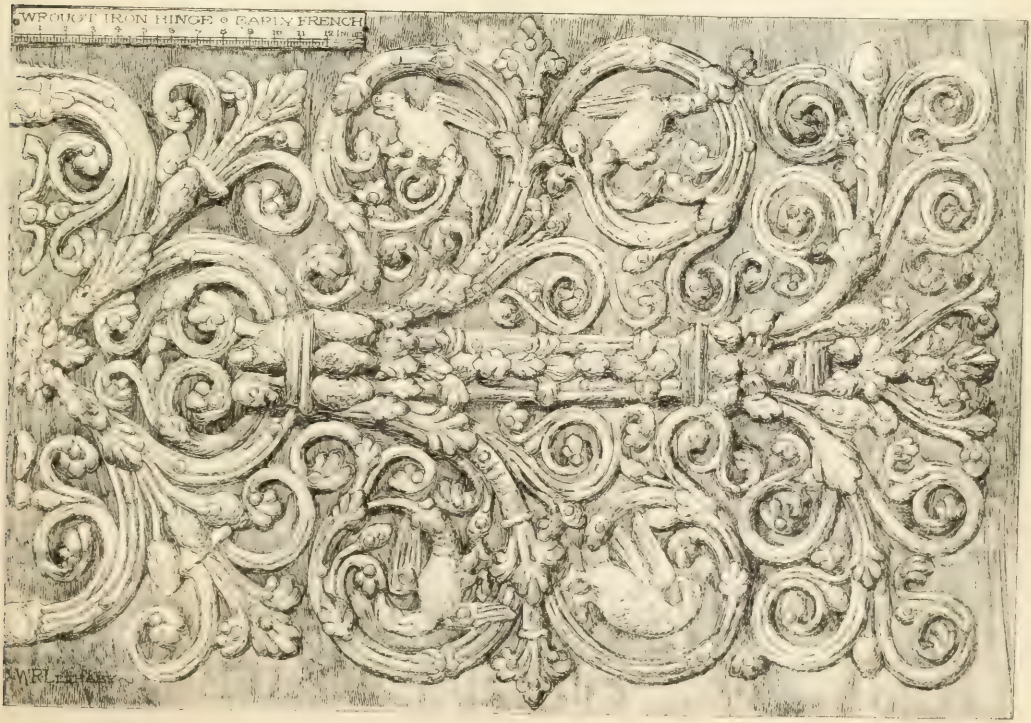
Akerman Photo lith. London

HOUSE . RECENTLY . ERECTED AT . SEVENOAKS. FOR . P . S . C . BREWER . ESQRE WILLIAM . MILFORD . TEULON ARCHITECT

Design selected for Proposed New Church. ——St. Matthews. Sydenham.—— South-West Prospect.

SOUTHWELL MINSTER
WEST DOOR
NOTTINGHAMSHIRE


LINCOLN CATHEDRAL
Part of Chancel Gates from Aisles
EARLY IRONWORK
The scale is approximate only
W.R.Lethaby Aug 1878


WROUGHT IRON HINGE o EARLY FRENCH
W.R.Lethaby

APOCALYPTIC ART.

IN a very exhaustive article in the last part of Messrs. Audsley's "Dictionary of Architecture," on the subject "Apocalypse," the authors trace the conceptions of the early and mediæval artist in relation to the Revelation of St. John the Divine. Messrs. Audsley's article is devoted to a summary of the modes of representing these mysterious scenes. Mention is made of Viollet-le-Duc, who remarks of the Apocalypse that "it does not lend itself to sculpture, but opens a wide field to painting." We here give an outline of the treatment of the principal subjects that have been represented pictorially by the artist of mural painting, stained glass, and illuminated MSS. The apocalyptic scenes appear in the churches of the Eastern monasteries, on Mount Athos and elsewhere, in all of which Greek canons are followed. Pauselinos, the 11th century, wrote a directorium of Greek art. In the crypt of the Cathedral of Auxerre a series of subjects from Revelations were painted, only two of which are preserved, according to Didron. Eastlake alludes to many Italian mosaics in which the apocalyptic visions are depicted, as in the church of St. Prassede, at Rome, above the arch of tribune, while those in St. Mark's, at Venice, in the vaults and spandrels, are well known.

But we pass on to notice the modes of representing the chief scenes, as given by Pauselinos, upon whose authority the authors chiefly rely. The first subject was taken from the opening chapter of Revelation, where St. John is in the Isle of Patmos (i., 9-20). According to Greek tradition it presents a cave or grotto, in which St. John is seated intently gazing behind him at a vision which illuminates the dark recesses of the grotto. This vision is a figure of Christ wearing a long white robe, girt with a golden girdle, with seven stars in his right hand, and with a two-edged sword issuing from his mouth. Around the figure are seven golden candlesticks, and the whole is surrounded with clouds. The western artists, it is said, treated this vision in the same manner, though the two-edged sword is shown in two ways. In one the sword is double-edged, held in the mouth of the Deity; in the other two swords issue from the mouth right and left. The first rendering is shown in a sculpture at Notre Dame, Paris, and the second in glass at Champeaux, near Melun. The second subject represents Revelations iv., 1-8, "I looked and behold a door was opened in Heaven, and immediately I was in the spirit: and behold a throne was set in Heaven, and one sat on the throne," &c. According to the Eastern conception in the upper part of the composition is a seated figure of God the Father —on his right hand a book with seven seals. Below and around the throne is an expanse—a sea of glass. In front are seven burning lamps and four symbolic creatures covered with eyes. On each side are 12 aged figures, clothed in white robes, and wearing crowns of gold. These 24 elders are seated on golden thrones, and hold golden vessels with their right hands, and harps in their left. In the centre of composition, before the throne, is a lamb, with seven horns, seven eyes, and a wound in its side, and with its fore-feet placed on the book held by the Father, and underneath the throne is a large angel, winged, with extended arms, proclaiming, "Who is worthy to open the book and to loose the seals thereof?" Sometimes the lamb is shown alone in Western art, with one or more feet placed on a book with seven seals. In the Cathedral of Auxerre window the lamb is represented standing upon the book. In the Church of St. Etienne du Mont is a Late glass (1614) window, showing a complete representation.

Subject III., taken from Rev. vi., 1-8, shows a mountainous country, with human figures prostrate and crouching in terror. Above is a man seated on a white horse, carrying a crown and bow; behind horsemen—one mounted on a horse, holding a sword, behind another on a black horse, holding a pair of scales, and lastly, the figure of Death on a pale green horse. Subject IV., the opening of the fifth seal, shows an altar with small figures underneath in white—souls of martyrs, with uplifted hands and eyes; on each side are angels. This subject was a favourite one. At Rheims is a sculpture of it on one of the west portal buttresses. The opening of the sixth seal (Rev. vi., 12-17) (Subject V.) was a difficult one to portray. It was represented by crowds of men of all conditions, crouching in caverns and rocks, masses of mountain in gloom, the sky as a scroll partially unrolled, the sun as a black orb, the moon red, and the stars falling. There is a fine painting in the church in the island of Kolouri (Salamis).

Subject VI. (Rev. vii., 1-3) has been rendered literally by the mediæval artist, and Didron refers to the different modes of representing the four winds, and the authors quote the note. Subject VII. (Rev. vii., 9-15) is represented with a centre seated figure of the Eternal Father—before Him is the Lamb, opening the book of Gospels. Round the throne are the tetramorphs and the nine choirs of angels, below an immense crowd of people, clad in white, carrying palms, and at the sides the four and twenty elders. St. John, whose attention is drawn to the saints, is one of the figures. In Western art the Father is not introduced, His presence only being indicated by a hand in the clouds; in fact, this subject is regarded as the adoration of the Lamb, in which a dove, the symbol of the Divine Spirit, is portrayed. The opening of the seventh seal, Subject VIII. (Rev. viii., 1-13), is a very difficult and complex subject, but Greek tradition has represented it, in chief part, literally according to the text. Subject IX. (Rev. ix., 1-11) is a continuation, and the Greek formula depicts it as clouds, below which is an angel holding a key, looking down and blowing a trumpet. Underneath is a deep pit, from which smoke ascends—the falling star, the scorpions issuing from the pit, &c., being literally rendered. We have no space to quote the description given. Subject X., from the same chapter, shows the Eternal Father robed in white on a throne, a golden altar before Him, and an angel blowing a trumpet; the earth and mountains are at the bottom destroying human beings, and a crowd of soldiers with breastplates. Subjects XI., XII., and XIII. are rendered more or less in a literal manner. In the latter, which lends itself to the highest power of the painter, is a glory in which Jesus Christ is the central figure, and not the Father. The seven choirs of angels are disposed in concentric circles round the throne with Our Lord. Subject XIV. (Rev. xii., 1-16) applies the attributes of the "mysterious woman" to the Virgin Mary without disguise; in Western art no attempt is made to indicate the Virgin. The child of the woman is invested with a tri-radiated nimbus by the Greek artist. We pass on to Subject XVI. (Rev. xiv., 1-10) as one of the most sublime. Here is a high mountain, on the summit of which stands a lamb, invested with the tri-radiated numbers, holding in one of its forefeet a staff terminating in a cross. In the heavens is shown the Eternal Father upon the throne, while the remaining portion of the composition is filled with figures of saints, virgins, and angels, and representations of the fallen city. Subject XVIII., another mysterious scene, depicting the seven angels pouring out the cups of the wrath of God; and Subject XX. (Rev. xviii., 1-4), a vision that has taxed the Christian artist's powers, are described at length. In the cast the earth, with mountains, the sea, and a city are in flames, and the scene is rendered pretty literally from the text. Subject XXI. (from the 19th chapter, 11-21), Christ is shown mounted on a white horse, and clad in a scarlet robe, wearing a crown, with warriors clothed in white and mounted on horses behind, and kings and mighty men, also mounted, before; and near to the vanquished host is the pit of hell, into which angels are throwing the seven-headed beast and the Antichrist. In the Church of Notre Dame at Brou there is a very fine elaborate representation of this scene, called "The Triumph of Christ," and described by Didron. Subject XXIII. (Rev. xx., 1-3) is one of the grandest. It depicts the Second Advent and the Last Judgment. The last subject is from the 21st chapter, 1-23 verses. To those desirous of becoming acquainted with the pictorial representation of the Apocalyptic visions, as given by the Greek and Western artists, we commend the article of Messrs. Audsley, from which the foregoing outline has been taken.

THE NOBLE MODELS.

THE models of the late Matthew Noble, presented to the Corporation of Newcastle by his widow, have been arranged in the upper rooms of Elswick Hall, and will be open to public view in a few days. The arrangement of the examples has been made under the direction of Mr. J. Wood, of London. The models are, for the most part, portrait busts; but there are several statues, some half-dozen monuments, and a number of bas-reliefs. The statues are those of the Prince Consort, the Earl of Derby, Sir Robert Peel, Viscount Hill, and others. There are some sixty busts representing a large portion of the work of nearly thirty years. They begin with the Countess of Galloway in 1847, and close with Lord Albert Gower in 1875. A bust of Cromwell, evidently done from the portrait in the National Gallery, is remarkable for vigour and expression. The great majority of the busts are done from the life, and among the persons represented are Mr. Gladstone, Richard Cobden, Sir Wm. Fairbairn, Faraday, Lord Palmerston, and Earl Canning. Amongst the more ideal works of this character are busts of Sir John Franklin and Lord Nelson. The bas-reliefs are models for those on the monument of Wellington at Manchester, and those on the monument to the Earl of Derby at Westminster. The latter represent Lord Derby addressing the House of Commons, speaking at the Oxford Commemoration, taking part in organising the Cotton Famine Relief Fund, and presiding in Privy Council. The largest of all the monuments has been placed above the stairs. It was erected in memory of the son and daughter of Robert Heath, Esq. It will have a special interest as the most imaginative of the works of the sculptor. Two angels are bending over a grave, and above them there is a figure of Christ with one hand pointing heavenward. Three statuettes represent Gen. Havelock, Sir Robert Peel, and the Duke of Sutherland. One of the finest, though most simple of the monuments, is that of Earl Stafford. A bust of the earl surmounts a shield, on each side of which stands a soldier with gun reversed and bowed head. The models are a valuable addition to the art treasures of the town.

PLASTER OF PARIS.

M. LANDRIN, according to *Galignani*, has just communicated to the Academy of Sciences the results of long-continued studies relative to the different qualities of this substance, and the information he furnishes may be of considerable practical value to architects, builders, modellers, and others whose business requires the use of this material. He finds that the more or less rapid setting of the plaster is due to the mode in which it is burned. Its properties are very different when it is prepared in lumps or in powder. The former, when mixed with its own weight of water, sets in five minutes; while the latter, under similar conditions, takes 20. The reason probably is that plaster in powder is more easily burned than when it is in lumps, and what tends to prove that fact is that when the latter is exposed longer than usual to the action of fire it sets more slowly. Gypsum, when prepared at a high temperature, loses more and more its affinity for water, retaining, however, its property of absorbing its water of crystallisation. Plaster heated to the red, and mixed in the ordinary manner, will no longer set, but if, instead of applying the ordinary quantity of liquid, the smallest possible portion is used, say one-third of its weight, it will set in 10 or 12 hours, and then it is less porous, and becomes extremely hard. To prepare plaster for moulding it must be burned slowly for a long time, sufficiently to drive off all its water, and for its molecules to lose a part of their affinity for the liquid. M. Landrin stated that a similar result could be obtained by other means. If the plaster is exposed to the fire of the kiln for a time short enough to allow it to retain 7 or 8 per cent. of its water, it is useless, as it sets almost immediately; if, however, the burning is again resumed, the substance soon loses its moisture, and, if then exposed to the air, it very rapidly retakes its water of crystallisation, and then absorption continues more slowly. It can then be used; it sets slowly, but acquires great hardness.

A NEW TRIPOD MOTION FOR FIELD INSTRUMENTS.

We have received a pamphlet explaining the construction of a new tripod for field instruments, invented and patented by Mr. Daniel Hoffman, mining engineer, and manufactured by Messrs. John Davis and Son, of Derby and Newgate-street, London. It is well known to all engineers and surveyors that the present form of tripod head, with four levelling screws, has some defects; considerable time is wasted in setting up and levelling in the field, especially on rough ground; the levelling screws require continual attention in taking a sight and in correcting slight jars, and even after apparent adjustment farther manipulation is often necessary. The invention Messrs. Davis and Son bring to our notice appears to obviate these defects; it dispenses with unnecessary screws, while those used are made short, and therefore are steadier in action, while the quickness of the ball-and-socket motion is combined with the accurate adjustment of the parallel plate screws. Thus, by the construction of the new tripod the instrument can be at once approximately levelled without using the screws—a point we have no hesitation in saying will be much valued by all who have once used a theodolite or field instrument of any kind. After this is done a slight turn of the levelling screws is necessary to complete the adjustment. On looking at the new tripod action we observe that besides the ordinary half-ball, moved by the screws, an extra plate is provided, the upper part of which forms another half-ball of larger diameter, and having three times the surface of the lower one. This plate remains horizontal, whatever the position of the instrument which rests upon the spherical part of its centre, and slides upon it. The levelling screws by this motion always remain perpendicular, as the extra plate does not move. A slight turn of the screws completes the adjustment, the instrument turns upon the lower and smaller socket-joint, the upper one remaining clamped. The manufacturers assert that a transit with this improvement can be set and levelled five times in the same time that the old tripod can be set once; if half this time is saved the improvement will be greatly esteemed by surveyors who are obliged to take levels or observations in rough weather and under unpropitious circumstances. We understand the tripod of any instrument can be altered to this improved form.

Mr. Michael Higgins, a manure manufacturer, of Bermondsey, was summoned on Monday to the Southwark Police-court for contravening the byelaws of the Metropolitan Board of Works by creating a nuisance in the conduct of an offensive trade. The sanitary officer for the district having given evidence, the defendant was fined five pounds and costs.

The foundation stone of a new Foresters' Hall, at Reading, was laid last week. Messrs. Brown and Albury are the architects, and Mr. W. H. Simonds the contractor. The cost will be £4,500.

At the London Bankruptcy Court last Friday the failure was announced of Andrew Kelby, builder and contractor, of Bishopsgate-avenue, for £46,050.

At a meeting of the Barton-upon-Irwell sanitary authority, held on the 18th inst., Mr. John Price, C.E., at present resident engineer on the Main Drainage Works, Barrow-in-Furness, was appointed to the office of surveyor at a salary of £275 a year.

The City and District Banking Company, Carlisle, are about to erect new branch premises at Brampton and Haltwhisle, from the designs of Messrs. Hetherington and Oliver, architects, Carlisle.

A new Congregational chapel was opened at Walton-on-the-Naze, Essex, on Wednesday week. It is Gothic in style, and measures internally 58ft. by 31ft., and seats from 300 to 400 persons. Mr. Charles Pertwee, of Chelmsford, is the architect, and Messrs. Saunders and Son, of Dedham, are the contractors. The cost has been £1,600.

A new Congregational chapel is being built at Temple Cowley, near Oxford, and on Tuesday week the memorial stone was laid. The building is Gothic in style. Mr. Beasley is the honorary architect, and Mr. Henry Castle the builder.

Plans and designs have been prepared by Mr. Miles Aspinal, of Blackburn, for a new theatre proposed to be built in Victoria-street, in that town.

The "Stanley" sash opener and fastener has been awarded honourable mention, Class 66, Paris Exhibition, 1878.

Building Intelligence.

Bassenthwaite.—On Tuesday, the 24th inst., the Bishop of Carlisle consecrated a new church and burial grounds at the head of Bassenthwaite Lake, and dedicated to St. John the Evangelist. The church comprises nave, 62ft. by 25ft.; apsidal chancel, 24ft. by 21ft.; organ chamber, vestry, south transept, with bell tower and spire at east angle, 90ft. high. The external walls are faced with light grey parpoints, and dressings of Howrigg stone from the neighbourhood of Carlisle. Roofs covered with green Langdale slate. Internally, the walls are faced throughout with rubbed Howrigg stone. The whole of the internal woodwork, and doors and ceilings, and bench sittings, are in oak. The nave has a boarded waggon-headed ceiling, with groin ribs, and the chancel vaulted with oak groin vault and moulded ribs and carved bosses; the roof ribs springing from attached moulded stone shafts and foliated caps. The pulpit is the gift of a lady in the neighbourhood, and carved by her. It is panelled in oak, the panels filled in with carved foliations of vine and passion flowers, and corn flowers, &c. The style adopted for the church is of late twelfth century, the whole of the work being of an unusually costly character (for that district). The church has been built from the designs of Mr. D. Brade, of Kendal, selected in competition in 1874.

Beauvale, Notts.—New Board Schools, erected by the Greasley School Board, at Hill-Top, Beauvale, were opened on the 16th. The boys' and girls' school are placed at right angles, the infants' department being planned as a diagonal link. The buildings are of red brick, with stone dressings, and the roofs are of red and blue tiles, with a turret of varied design in the centre of each. The principal rooms are planned on a 10ft. basis, for 200 boys, 200 girls, and 150 infants. A dado of white bricks goes to a height of 4ft., and is separated from the upper portion of rough red bricks by a tile border. The windows are filled with casements, and ventilators are also provided in the roof. There are two large class-rooms attached to each department. The infants' room is floored with blocks of wood placed endwise. Mr. Sutton is the architect to the board; the contractors were Messrs. Coxon and Donelly, and the cost has been about £5,000.

Burford, Oxon.—The central tower and chancel of this church were re-opened on Tuesday week, after restoration. The modern ceiling of lath and plaster has been removed from the interior of the lantern, revealing the rich Late Norman carving. Owing to the great weight of the belfry stage and spire, added much later, the tower arches were found to be much crushed. New stones have been inserted where needed, and the fabric has been girded with iron bands. In the chancel a new Dantzic deal roof has been put up, oak clergy and choir stalls added, and a pavement of Godwin's tiles laid. In the north-east corner of the 15th-century chapel, on north side of chancel, is a richly-gilt and carved reliquary, discovered by mere accident by the vicar. The vestry, which is also a 15th-century chapel, has been repaved, repaired, and the groined roof cared for. The church has been decorated by the addition of two mural paintings. The nave and its aisles were restored six years since, at a cost of £2,700, and it is further proposed to continue the work by re-seating the church, erecting a new organ, and restoring the niches in the east wall.

Cleeton.—On Saturday, Sept. 13, a new church was consecrated at Cleeton. The building is in the Early English style, from stone quarried within one hundred yards of the site. The stone for the dressings came from Painswick. Inside it consists of a nave, chancel, organ-chamber, and vestry. The pews and fittings generally are of solid oak, grown with the exception of a small quantity on the estate, £600 worth of native oak having been used. The cost of endowing and building the church, building the vicarage, schools, &c., is between £8,000 and £9,000. The architect was Mr. T. Nicholson, of Hereford, and Mr. Page, of Leominster, was the builder.

Drogheda.—The new Dominican Church of St. Mary Magdalene was opened on Sunday, after having been eight years in course of construction. It is cruciform in plan, consisting of nave, transepts, chancel, and side chapels. The total length is 111ft. by 30ft. breadth across nave, and 62ft. across the transepts. The material used is the limestone of the district, the walling being of pitched-faced work, relieved by bands and dressings of white limestone. The tower stands in the angle of the nave and south transept. It is 90ft. high, and is terminated by a gabled roof. The windows are of three lights each, with the exception of that in the west front, which has six lights. The tracery is geometrical in character. The arcades are supported on Aberdeen granite columns with Portland bases and caps. The roof is boarded and panelled in pitch-pine, with arched principals. The lights in the octagonal east end of chancel are filled with stained glass by Mayer, of Munich, the subject of the centre one being the Crucifixion. The side chapels contain altars of oak, carved and decorated. The high altar, of white marble, is in progress. The architect is Mr. George Ashlin, of Dublin. The works have been carried out by the local tradesmen without a contractor. The total cost has been £8,000.

Halifax.—The restoration of the parish church is in gradual progress, from the plans and designs of Messrs. Scott. The chapel at the east end of the north aisle and the eastern part of the aisle have been re-roofed. The old timbers have been cleansed and scraped, and, where found serviceable, replaced. Where this was not practicable new ones of oak have been substituted. The rebuilding of the parapet to the north aisle of choir has vastly improved the external appearance. When the walls were being prepared for this parapet an old tombstone was found built in. It was adorned with a raised floriated cross, and was broken in two pieces. The fragments have been put together and, together with a stoup, are to be preserved in the vestry.

Liverpool.—The Harrington Board Schools, in Stanhope-street, were opened on Monday, the 23rd inst. The schools are in three departments on three separate floors. They are for infants, girls, and boys, and are calculated to accommodate 600 children. The architect is Mr. T. Mellard Reade, C.E., F.R.I.B.A., the architect to the board. The builders are Messrs. Alex. Rule and Son, of Liverpool; the clerk of works Mr. Jas. Peers. The ventilation was carried out by Potts' Patent Cornice Ventilation Co.

Orsdal.—The new church of St. Clement, Orsdal, was consecrated on Saturday. The church consists of a nave 24ft. wide, 78ft. long, and 39ft. high to wall-plate, with north and south aisles, 13ft. 6in. wide and 20ft. high to wall-plate. The chancel is 24ft. wide and 30ft. long, with north and south aisles. The roofs of nave and chancel, which are continuous throughout, are 60ft. from floor to ridge; the chancel is groined in brick, with one bay of quadrupartite and one bay of sexpartite vaulting. A lofty *flèche* of timber is constructed over the chancel, rising to a height of 60ft. over the ridge of the roof. The church is built entirely of red brick and terra cotta, except the pillars and capitals, which are of Runcorn red stone. The style of the church is Decorated, of the Geometrical period, the roofs are covered with Ruabon red tiles. The cost, exclusive of fittings and boundary walls, has been £7,500. Messrs. Paley and Austin, of Lancaster, have been the architects; and Messrs. Wilson, Erskine-street, Hulme, the contractors.

Another step has been made in the movement for building a vestry hall for Wandsworth, the vestry having on Thursday evening, the 19th inst., resolved to ask permission from the Local Government Board to their borrowing £10,000 for that purpose—£2,000 for a site in the High-street and £8,000 for buildings.

The Queen's-wood School for Wesleyan-Methodist ministers' daughters was inaugurated last week. The premises are situated in King's-road, Clapham Park, and were built some years since for a school by Mr. Thomas Cubitt, the contractor. The present alterations have been carried out under contract by Mr. J. D. Hobson, Mr. James Weir being the architect; the total outlay being about £1,200.

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TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.]

All letters should be addressed to the EDITOR, 31, TAVISTOCK-STREET, COVENT-GARDEN, W.C.

TO OUR READERS.—We shall feel obliged to any of our readers who will favour us with brief notes of works contemplated or in progress in the provinces.

Cheques and Post-office Orders to be made payable to J. PASSMORE EDWARDS.

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Cases for binding the half-yearly volumes, 2s. each.

RECEIVED.—E. C.—H. B. Co.—F. W. B.—Q. S.—E. T.—S. B. B.—F. U.—J. and W.—M. and H.—A. F. O.—H. T.—E. B. and S.—T. G.—W. H. L.

DRAWINGS RECEIVED.—H. Ough.—L. Bell.—E. Birchall.

J. H. R. (The minimum cost for churches may be taken at about £4 per sitting, and a fair medium at from £5 to £8. We cannot refer you to any comprehensive treatise on the subject of planning and construction.)—QUERIST. (It is not necessary to have a licence in order to value house property for mortgage, &c. In answer to your second question, write to the Secretary of the Educational Department for printed regulations for schools.)—E. E. B. (The eagle was used as symbolical of St. John the Evangelist, and is intended to represent the preaching of the Gospel. For ancient seats consult "Brandon's Analysis and Parish Churches," "Pugin's Examples of Gothic Architecture," "Colling's Details," and our own columns.)—FOLIAGE. ("Art Foliage," by J. K. Colling, would probably suit your purpose. The series was published in the BUILDING NEWS a few years ago.)—A FATHER. (It is impossible to fix any reliable average. For the first say from 50 to 200 guineas; for the second from 30 shillings to £10 weekly, according to business qualifications.)—DRAUGHTSMAN. (You are bound to give at least a quarter's notice.)

"BUILDING NEWS" DESIGNING CLUB.—"B" IN A SQUARE. (We consider our prizes quite equal to the work, and bear favourable comparision with those offered by the Architectural Societies. Our desire is to encourage all classes of students, not simply the "happy and laborious" advanced student, but the elementary beginner as well.)—CINQUEFOIL, FRANK OAKDEN. (All drawings are returned, but unless rollers are sent we cannot be responsible if the drawings get crushed in transmission.)—WILLIAM MARTIN. ("Use" in three circles.)—JOHN LETHABY. (No stone dressings are to be used.)

ERRATUM.—"A MEDIÆVAL ARCHITECT'S COMMISSION."—On p. 264, line 4, for "Ixfole" read "Lx foote."

Correspondence.

LEEK FEVER HOSPITAL.

To the Editor of the BUILDING NEWS.

SIR,—On reference to the BUILDING NEWS of August 2nd and 16th I thought it necessary, in my own justification, to throw a little more light on this disgraceful competition. According to the copy of August 2nd, Mr. Critchlow made a very bold statement:—"That the author of 'Epidemiology' had had information that no other competitor had." This (as I have said before) is untrue. As to the "reports going about the town" that it was "two to one" that my claim of forty guineas on the commissioners for work done over two years ago "would be thrown in" is too absurd to make any further reference to. I understand that a member of the board has an interest in "Cave Pestem"—in fact, he admitted it to me himself (previous to the competition). Although this design ("Cave Pestem") was sent in under a local land surveyor's name, it was designed by an architect not resident in Leek at all.

It was also stated that a plan had been shown to me from the Local Government Board that had not been shown to other competitors. This I cannot understand, unless it refers to the designs I made and submitted to the Local Government Board about one year ago, copies of which I, of course, could have supplied (to each competitor) had I been paid for them.

Mr. Critchlow also states that the conditions were "extremely vague and unsatisfactory." I don't know what more he could want, unless he would have the commissioners to make the designs and instruct each competitor to copy them.

Had "Cave Pestem" been placed first instead of "Epidemiology," no doubt Mr. Critchlow would have said the conditions were very good. But from the fact that the commissioners awarded "Cave Pestem" the second prize is a sufficient proof to me that the conditions were anything but vague.

"A Commissioner" says "Epidemiology" had an advantage over London architects, because the buildings were shown in three different positions, and suggested the purchase of the adjoining field. I suppose they (the London architects) might have done the same had they seen the desirability.

May I also trouble you to publish the letter (inclosed) from the last issue of the *Leek Times?*—I am, &c., JOHN TAYLOR.

Author of the Designs "Epidemiology."

Leek, Sept. 24, 1878.

[*Copy.*]

GENTLEMEN,—In reference to the report of the Commissioners' Meeting in the last issue of the *Leek Times*, relating to the above subject, a few remarks in my own justification as a competitor may not be out of place. The letter from the Local Government Board, containining their Architect's notes on the four plans submitted to them, points out *many* defects in the designs, "Esperance," "Cave Pestem," and "Health," but does not seem to be able to find any fault with "Epidemiology," except the disproportionate cost of the angle projections. It is very evident to me that he (the Architect) has misunderstood the drawing, or could not have made such a remark. If you will refer to the drawing of the ground plan (No. 2), you will see an alternate design (line for line with "Esperance") which does away with one angle projection (the bath-room) to each ward if thought desirable. This alteration and cutting out the upper story of the administrative block would at least reduce the cost £200. "Epimediology" would in this case cost £237 less than "Esperance," and have the more desirable advantage (if not an absolute necessity) of east and west lights to wards which "Esperance" cannot have. I may also add that it would be unfair to select the design of "Esperance," even though the Architect to the Local Government Board has recommended it, when it is not in accordance with the conditions (dated May 25th, 1878) drawn up by the Commissioners. See No. 5, which runs as follows:—"The wards to have one foot of window space to 60 cubic space, *and windows to be strictly opposite.*" This latter clause (in italics) is totally ignored in the design of "Esperance," and on this ground I respectfully submit that it would be manifestly unfair to adopt the recommendation (*not decision*) of the Architect to the Local Government Board, and I am convinced that if these circumstances had been pointed out to Mr. Smith (the said Architect) he would agree with me. Further, it does not appear to me that any expression of opinion is given by the Medical or Sanitary Department of the Local Government Board upon *any* of the four designs referred to them. The question was raised at the meeting on the 3rd instant:—"Would the Local Government Board approve the design marked 'Epidemiology?'" Certainly, if they would "Esperance;" it is in principle exactly the same, the only difference being the out-offices are placed anglewise, or at the corners, instead of at right angles to the main building, thus obtaining the lights (east and west) referred to previously. "Health" does not provide an alternate design, so that in this case the Architect would be quite right as to the additional cost. Presuming the newspaper report of a former meeting of the Commissioners to be correct, the Surveyor's estimate of "Epidemiology" was £1,706. Had the Surveyor, in his calculation, taken into consideration the alternate design (which ought to have been done), which dispenses with the four bath-rooms (or angle projections referred to by the Architect), together with the deduction previously named, would reduce the cost to £1,506, according to the Surveyor's estimate.—I am, gentlemen, yours obediently, the author of the designs

"EPIDEMIOLOGY."

OFFICES, GREY FRIARS, LEICESTER.

SIR,—In the illustration of this building on Sept. 13, so truthfully and rigidly has the spirit of old work been followed that I really thought it was a drawing of an old house in my own town until I saw a different title underneath, nor was I by any means alone in my surprise. If any reader will compare this building as illustrated with a drawing of an old house in Notte-street, Plymouth, which appeared in the BUILDING NEWS on July 17, 1874, he will not, I think, wonder at my having made such a mistake. If the architect has not seen the Plymouth house, or its illustration, the coincidence is almost miraculous; but if he has, he surely might have acknowledged his debt to the old house.—Yours, &c.,

A PLYMOUTH STUDENT.

SIR,—Surely there must be some mistake in your impression of Sept. 13th. The above-named buildings are signed "Isaac Barradale," architect, whereas on looking through the back numbers of my BUILDING NEWS I find it to be an exact copy of on old house in Notte-street, Plymouth, sketched by H. A. Gribble, and illustrated by you in your number of July 17th, 1874.—I am, &c., JUSTICE.

[The modern building is not an "exact" copy of the old one, but the general resemblance is certainly very close, and struck us on our first visit to the Academy.—ED.]

REMARKABLE SEPULCHRAL SLAB AT CARLATTON.

SIR,—As the monumental slab at Carlatton seems to be a puzzle to many, from the fact of its bearing military and ecclesiastical emblems, might I suggest that it probably commemorates one who after being a soldier became a priest, the sword being on the sinister side of the cross to show the inferiority of the secular to the ecclesiastical state, and which the inscription, merely noticing "Henricus de Newton" as a vicar, tends to confirm. A remarkable brass at Winwick, Lancashire, appears to bear out this solution of the mystery, for here 'Sir Peter Legh' is represented in full plate armour, over which he wears a chasuble, and the inscription states him to have been a knight who, after the death of his wife, became a priest. Might this not have been the case with "Henricus de Newton," and the motive for the sword and the chalice on the same slab?—I am, &c.,

Horsham, Sept. 24. J. LEWIS ANDRE.

SPECULATIVE HOUSES—WHAT IS AN ARCHITECT?

SIR,—Your article on "Speculative House Manufacture" leads me to ask the foregoing question, because it is so common to see men start up and style themselves architects whose previous occupation and training has had no connection whatever with building operations. I have known several who were perfectly innocent of any knowledge of building materials or of the manner of putting them together, and some of these worthies manage to tumble into lucrative practice. Sometimes a plodding clever man of reticent habits will take as a partner one of these enterprising fellows who, with a smattering of architectural lore, is endowed with a large amount of cheek, and whose business is to hunt up commissions and do the wine and dinner business.

Then others are always prowling about and scent a commission almost before you have thought about it yourself. The typical representative of this class begs permission to show you a sketch supposed to be prepared for the occasion, but of which he has a large stock. Having by this means introduced himself, he ultimately cajoles you into giving him directions for the final plans, &c., which he at once puts into the hands of a London designer, or in some cases the elevation only, and tacks on to the same a crude plan of his own; but when your building is completed you will most likely find it is everything but a "joy for ever."—I am, &c., NO HUMBUG.

Mr. B. Smith, foreman at Mr. Bladwell's joinery works, Bath, was presented on Friday last with a silver teapot by the workmen as a mark of respect on leaving the city.

Intercommunication.

QUESTIONS.

[5520.]—**North Point.**—Will some reader inform me whether it is correct to show the true north point, or the magnetic north point on plans, also the present deviation in degrees?—X. Y. Z.

[5521.]—**Lights.**—I shall be obliged to any of your readers who will enlighten me as to the following matter:—A and B are the respective owners of two contiguous pieces of ground, divided by a fence; B erects within 3ft. of the fence a building with two windows overlooking A's property. Now, what course should A take to prevent B from securing, by virtue of 20 years' standing, an absolute right to these windows? Upon the attainment of such a right the value of A's property would be materially depreciated, for A could not build up to the fence for fear of obstructing the light to his neighbour's windows. I may mention that there is no chance of an amicable arrangement being made.—INQUIRER.

[5522.]—**Thickness of Metals, Glass, &c.**—Will some reader give the thickness in decimals of an inch of sheet zinc (Nos. 10 to 18)? And also state the best authorities on the thicknesses of sheet metals, glass, &c. "Molesworth" (old edition) gives very little information on the subject.—ZINC.

[5523.]—**Arresting Dry Rot.**—Can any reader inform me if there is a solution that will stop dry rot in timber, and if so what is it?—W. H.

[5524.]—**Algiers.**—Can any one give me information regarding the archæology of Algiers, and if much building is at present going on?—H. M. M.

[5525.]—**Beacons.**—Are any of the following beacons on the Goodwin Sands still standing:—1. Admiral Bullock's wooden mast beacon—the first—erected in 1840? 2. Mr. Steward's (C.E.) iron mast beacon, erected in 1844? 3. Mr. J. Walker's (C.E.) iron mast beacon, erected in 1844 or 1845? 4. Is the iron beacon at present standing either of these? 5. Is there any book or pamphlet giving an account of these several attempts?—G. B. G.

[5526.]—**Cemetery Chapels.**—I have been told that it is the custom in some cemetery chapels to have a revolving table for placing the coffin on, so as to facilitate the turning the body feet foremost when leaving the chapel. Will some one kindly describe its construction and usual dimensions, and oblige—A TEN YEARS' SUBSCRIBER.

[5527.]—**Lawn Tennis.**—I am desirous of making a disused barn available as a lawn tennis court for the winter. Will some of your readers inform me of a good and simple floor for this purpose—one that could be laid by ordinary country workmen? I have been recommended gas-tar and ashes.—W. W. K. CLARKE.

[5528.]—**Smoke Nuisance.**—Can any of your practical correspondents give me a good suggestion for constructing a brick copper to consume its own smoke? Upon sultry days the smoke, instead of ascending from the chimney top, descends into the surrounding gardens, &c., and thus becomes an intolerable nuisance to the neighbours. In consequence of this I have been served with a notice from the police to remedy the defect. The chimney has been considerably heightened, but to no satisfactory result. Any information upon this subject will be thankfully received by—ONE IN A FIX.

[5529.]—**Foreign Appointments.**—Will any of your numerous readers kindly tell me if it is possible to obtain a commission under Government abroad as assistant surveyor or clerk of works without passing the Civil Service examinations, as the languages would stop me there? If so, to whom should I apply? I should not object to Cyprus; or where would it be advisable to go abroad with an almost certain chance of being employed either privately or under Government?—AN OLD SUBSCRIBER.

REPLIES.

[5310.]—**Swastika.**—The swastika was a cross with four nails, representing the instrument used for producing the holy fire. The name is given to the instrument by Sanscrit scholars. At the point where the two pieces of wood cross each other was a hole, in which a third piece, in the form of a lance, was rapidly rotated by means of a cord, till fire was generated by friction. For information as to the rites which attended the production of the holy fire see Schliemann's "Troy and Mycenæ," p. 105.—C. P. EDWARDS.

[5444.]—**Proportion.**—(This is one of 17 queries of which only four have as yet been answered.) The best way to study proportion is to read the article upon it *(le neuvième)* in Viollet-le-Duc's "Entretiens sur l'Architecture." This book has, I believe, been translated by Mr. B. Bucknall. The proportions of buildings in the Classical styles may be studied from the works of Vitruvius, Palladio, &c.—C. P. EDWARDS.

[5496.]—**Figures in Perspective.**—There is no rule for placing figures in a perspective. In a drawing intended only for architects a single figure will be sufficient, in order to give scale to the building illustrated, and should be placed in a position where it will best serve this purpose, as at the principal entrance. The height would be found in the same way as the height of a column or window head, or other feature. In a drawing intended to attract a competition committee you may place as many figures as you like, but their position and size must depend upon the artist's knowledge and experience. Note:—"Geographers in Afric maps place elephants to fill up gaps."—C. P. EDWARDS.

[5508.]—**Chimney Flues.**—Having planned many cottages of the class mentioned, I may say I have never made the flues larger than 9in. square, and I can guarantee that "J. N. J." will not find that size insufficient in capacity; in fact, a 9in. pipe flue would be better still. I would add that a flue 14in. × 9in.—the conventional size—is quite unnecessary now; the square flues draw better, there is less space for the lodgment of soot, and, what is equally important, the sweeper's brush makes a cleaner sweep. Large flues are a mistaken notion, and should be placed along with that other exploded notion of large drains.—G. H. G.

[5510.]—**Didron's Works.**—I believe there is a translation of the "Manual d'Iconographie Chrétienne" in Bohn's series.—BIBLIOS.

[5510.] — **Didron's Works.** — M. Didron's "Manuel d'Iconographie Chrétienne" has been translated into English some 14 or 15 years, and I believe "C. F. W." will find it in Bohn's publications, under the title of "Didron's Christian Iconography."—W. S.

[5512.]—**Chimney Stalk.**—The rents alluded to by "Builder" can only be the effects of expansion by heat, and it has been brought about by one of three causes:—1. The inner lining of fire-bricks has by some inadvertence been allowed to touch the shaft; 2. In connecting the boilers the heat or fire has been allowed to pass up the space between the lining and the shaft itself; 3. As the lining is only 20ft. high, and the rents or cracks in the shaft 40ft., it suggests that the great point of internal expansion was immediately above the lining, and that from this point the fractures travelled upwards and downwards, say 20ft. each way—a length and regularity that could only occur in brickwork of a first-rate character. The fault lies in not economising the heat by the better construction of the boiler flues, and the party interested would do well to make himself acquainted with the patent economisers manufactured by Green and Son, of Wakefield, which exhaust all the heat before reaching the chimney.—W. S.

[5513.]—**Notice to Leave.**—Unless an understanding was made as to railway fare I am afraid "W. F." cannot recover. Notice should have been given legally from the day of commencing duty. But is it worth while to dispute so trumpery a point, as a week's notice has been given.—M.

[5513.]—**Notice to Leave.**—If "W. F." was paid on Saturday—the customary end of the week—it fixes that time as the legal end of the week, and he was entitled to a clear week's notice—*i.e.*, notice not later than the Saturday. If "W. F." was engaged in a town at a distance, and paid his fare to reach his place of employment, he would, by courtesy, have the same refunded to him by his employer; but, unless there was some written agreement respecting these fares, they would not be legally recoverable from the employer. If the notice was given on the Wednesday to terminate the engagement on the following Saturday it was illegal, and "W. F." can claim for a week's pay in lieu of notice; but it is a nice point whether "W. F." should not have been on the ground of his employer during this week, and there to have tendered his services. The employer may plead that "W. F." sold his services in some other quarter that week; but above all comes the question, did "W. F." misconduct himself when in the employ in question? If so, then he breaks the engagement on his part, and is liable to even instant dismissal.—W. S.

[5514.]—**Damp Walls.**—"Architect's" complaint is the old one of solid walls *versus* damp. The only remedy I can suggest is to slate-hang the exterior angle, if not a visible part, or to batten the room inside. An easier and cheaper remedy is to line the walls with tinfoil, and then re-paper it; but I have some doubt of its success in the present case, when the exposure is to the south-west.—G. H. G.

[5514.]—**Damp Walls.**—From the description given by "Architect" this looks like a case of atmosperic condensation, as we cannot expect a shower of rain "however slight" to penetrate a 14in. brick wall, and the wet to pour down the inside. If it is a case of condensation try the effect of ventilation in the chimney, or other place by which the air can be set in motion. If it is a case of damp through the wall it is proof it is built of porous material, and it should be painted externally or cemented, or boarded and then painted. But if the brickwork itself is to be painted it should be done when the wall was in as dry a state as possible, say between wet seasons or periods of heavy rain.—W. S.

[5514.]—**Damp Walls.** — "Architect" should have said whether the bricks are good and sound, whether dense or porous, and whether the work is well built in good mortar. Does the roof come well over the walls both at eaves and gables, or how is it finished off behind parapets? How thick are gable walls? There are plenty of houses as much exposed as the one in question can be, and which yet are dry. By knowing such details as these we may find out the cause of damp and its cure.—THOS. BLASHILL.

Our Office Table.

A MEETING of the St. Luke's Artisans' Dwellings Scheme and Street Improvement Association, held on Tuesday evening at the Friends' Hall, Banner-street, at which Mr. G. W. Carter presided, was called for the purpose of considering the action of the Metropolitan Board of Works with respect to the wholesale demolition of the houses of the poor and the stagnation of trade in the district, and for the purpose of impressing upon the board the necessity of immediate action to give the people suitable homes. In opening the proceedings, the chairman pointed out that as long ago as December, 1876, a deputation waited on the Board of Works, and it was then promised that the matter should be expedited. What had happened? Two years had passed, and not a single brick had been laid, although many other houses had been pulled down. The fact was the people in that district were in a worse position than they were two years ago. The board had not kept its faith witn the people, and the meeting had been called to try and find out what means could be brought to bear on the board. Mr. Fuller proposed, "That this meeting views with alarm the action of the Metropolitan Board of Works, by reason of its constant demolition of the houses of the people, while not providing them with suitable ones in their stead, according to their promise eighteen months ago, and particularly draw their attention to the vast amount of ground now vacant, which they could, if so disposed, at once utilise for the required purpose." The resolutions having been discussed were adopted unanimously. Another resolution was adopted to the effect "That a deputation wait on the Board of Works at their next meeting, to urge upon them the necessity of immediate action in this matter."

MR. JOHN PENN, the eminent engineer, of Greenwich, died on Monday night, at his residence at Lee. He was born in 1805 at Greenwich, where his father had during the close of the last century established a business as a machinist and agricultural implement manufacturer. It was there that at a very early age John Penn acquired that proficiency at the forge, the lathe, and the vice-bench, by which, in after life, he was enabled to teach his men the excellence and accuracy in workmanship for which the firm became famous. Mr. Penn was elected a member of the Institution of Civil Engineers in 1828, and a Fellow of the Royal Society in 1859. He was also a past President of the Society of Mechanical Engineers, and had received many marks of distinction from various foreign Governments. He leaves four sons and two daughters. In 1872 he took his two eldest sons into partnership, and they are now the heads of the firm, which employs upwards of 2,000 hands. Mr. Penn himself retired from business in 1875, after 60 years of work, not more honourable to himself than it has been useful to his country and the world.

MR. GEORGE PARKER BIDDER, the well-known civil engineer, better known as the celebrated "calculating boy" in the earlier quarter of this century, died last Friday. Mr. Bidder was born in 1806, and consequently he had completed his 72nd year. He attributed the first stimulus given to his genius to passing the door of a blacksmith's shop which stood opposite to his father's, in which, when old enough, he was, in his own words, "raised to the dignity of being allowed to blow the bellows." As the "calculating boy," he was one of the wonders of the age, and many probably have heard how George III. and Queen Charlotte would have him at Court and listen in wonder to him. Eventually educated at Edinburgh, through the kindness of a friend, he afterwards embraced the science of engineering under Henry Robertson Palmer, who was the founder of the Institute of Civil Engineers. His connection with George Stephenson, whom he assisted in his great Parliamentary contests, introduced him to the hard work of the profession, and subsequently, in conjunction with his son, Robert Stephenson, he took part in some of the greatest works in the early days of railways.

During the later part of his career he was consulted by the Government constantly on pressing and important matters, but had practically retired from every-day work.

SIR RICHARD GRIFFITH, who for more than half a century has filled a prominent place in Irish official life, died on Monday at Dublin. He completed his 94th year on Friday last. He was Chief Commissioner of Public Works, a position which he held up to his death, though latterly his duties have been only formal. Sir Richard Griffith in 1797 obtained a commission in the Royal Irish Artillery, but on the advice of his father devoted his talents to the pursuit of a civil engineer. At the early age of 23 he was unanimously elected a fellow of the Royal Society of Edinburgh. In 1808, immediately after receiving this honour, he returned to Ireland and entered upon his professional career. In 1809 he received his first public appointment as engineer by the commissioners selected to inquire into the practicability of draining and improving the bogs of Ireland, and at the same time was selected as successor to the eminent chemist and mineralogist, Richard Kirwan, in the office of Inspector-General of His Majesty's Royal Mines in Ireland. After the Irish famine in 1822, the Viceroy, Lord Wellesley, appointed Mr. Griffith, as engineer, to improve and construct roads in the counties of Cork, Kerry, and Limerick. While he was thus engaged, the first edition of the geological map of Ireland was published, and before the institution of the Ordnance Survey he was appointed General Boundary Surveyor. In 1828 the general scheme, of which other officers were the forerunners, was initiated, and he was appointed commissioner for the general survey and valuation of rateable property. He was subsequently employed by the Government on various public undertakings, and was, in fact, referred to as an authority in engineering and other works for the improvement of the country. One of the most useful was effected in Dublin under his guidance by the diversion of the river Liffey from its former course to the King's Bridge, the devastation of a block of houses of the lowest class adjoining the Royal Barracks, which formed a nursery of disease and crime, and the acquisition of the fine open space called the Esplanade. In 1855, on the completion of his geological map of Ireland, he was presented by the late Professor Forbes, President of the Geological Society of London, with the Wollaston Medal, and in 1858 he was created a baronet in recognition of his public services.

A HANDY medium for the prevention of rust and corrosion on metal surfaces is a desideratum. From experience we can recommend Harrison's anti-corrosive paste to joiners and others who may be in search of such. By using this preparation, which is cheap and easily applied, metal goods of any kind may be stored away without fear of damage from damp or rust. When required for use, a dry cloth or leather will remove the paste in a few seconds without any further cleaning or polishing. We have previously used other preparations, but have found one great drawback in connection with all of them. The fatty acids contained in ordinary oils decomposed when the goods were stored away for any length of time, and caused the very evil they were intended to prevent. The basis of Harrison's Paste is free from any such objections, and may be safely trusted to. We can also speak favourably of a rapid and effective polishing powder supplied by the same manufacturers, which is used in the Government Dockyards, and which, while quickly removing all rust and dulness, does not scratch the most delicate metallic surface.

WITH reference to our remark last week as to the Yeadon Town Hall competition, and the terms of four per cent. commission to be paid on the completion of the new building, we are informed by a well-known firm of architects in the North that on their declining to compete on terms less than the usual five per cent., the committee informed them that "several first-rate firms of architects" had, before the competition was advertised, offered to "do it" for two and a half per cent., so that the committee are of the expressed opinion that they are doing a very generous thing by offering so much as four per cent. "Round Manchester," our informants add, "architects are willing to undertake work at almost any rate." Surely it must be to do it anyhow? Architects who will degrade their profession thus are scarcely worth censure, and the public have only themselves to blame if they break the old standing rule that "that which is worth having is worth paying for." The services of architects who are willing to work at 2½ per cent. on the buildings of an ordinary practice must indeed be dear at any price, and although thirty architects have sent in designs for the Yeadon Town Hall, it remains to be seen what sort of building Yeadon will get for its money and generous offer of four per cent.

THE arrangements for the meeting of the Social Science Association at Cheltenham on the 23rd prox. are fairly complete. The following are the presidents of departments, each of whom will deliver an address:—1. Jurisprudence, Mr. Commissioner Miller, Q.C., LL.D.; 2. Education, Hon. George Brodrick; 3. Health, Mr. W. H. Michael, Q.C., F.C.S.; 4. Economy, Professor Bonamy Price; 5. Art, Mr. Gambier Parry. Among the special subjects for discussion are, in Department 5, the improvement of street architecture, with due regard to economy, will be discussed, and how a sound knowledge of music may be more generally disseminated. In addition to these questions, which have been specially appointed for discussion, and on which papers have been obtained, papers volunteered on other subjects coming within the range of the departments will also be read and discussed. It is proposed to hold two *conversaziones*, to organise excursions to various places of interest in the neighbourhood, and to have a working men's meeting on one evening during the congress, to be addressed by the leading members of the congress. The proceedings will occupy eight days.

WE have received a sketch of an improved soil-pipe, suggested by Mr. B. H. Thwaite, of Bolton. The arrangement consists of an inner and outer tube, the inner pipe acting as the soil-pipe, having perforations above and below the inlets from the water-closets. The author says: "the air, suddenly displaced by the fæces and water, would escape through the perforations where its force extended to such a larger area would be completely nullified, and in the same way siphonic action could not exist, as there would always be air in the outer tube in equilibrio, which would fill up the vacuum in the soil-pipe caused by displacement." The ends of the soil-pipe being open and cut off near the upper inlet and the drain-pipe connection, a constant current of air would pass through it. Another advantage claimed is that in the event of the soil-pipe becoming leaky, no danger would arise. We have seen a similar arrangement of a double pipe in which the soil-pipe is made the centre one, and the space between it and the outer pipe the ventilating tube. There is certainly the germ of an improvement in the idea, and we commend it to the attention of our sanitary readers.

WE see the interesting edifice of St. Paul's, Covent-garden, the original church of which was designed by Inigo Jones as a chapel of ease to St. Martin's-in-the-Fields in 1631, is undergoing extensive repairs externally. Our readers may not be aware that the entablature and ashlaring of the side walls of portico were constructed of stone slabs about 3in. in thickness, those of the entablature being carried by timber work. The flanking walls of the portico have been lately removed, and an arch formed on both sides, so that the portico will in future be open at the sides as well as the front. This alteration is perhaps a violation of the integrity of Jones's design, which was one of the few examples of the Tuscan order, and of a prostyle temple *in antis*, as it is correctly designated. Probably the alteration is intended to harmonise with the reconstruction of the piazza and the other improvements contemplated, but we should like to know how the Anti-Restoration Society regard the innovation.

WITH regard to the recent correspondence in our pages respecting the restoration of St. Helen's and St. Martin's Church, Bishopsgate (see pages 172 and 201 *ante*), Mr. Henry Ough, architect, of Austin Friars, sends us a sketch taken in 1858 of some windows on the south side of the chancel. They were exposed, says the author, by the removal of an adjoining house, which has been rebuilt. Another small opening on the west side is supposed to have been a door closed with a shutter. The sketch forwarded to us shows a two-light window on the south side, the head of which is filled with flowing tracery, in the form of an elongated quatrefoil, the lights being cinque-foiled in the head. The other smaller window is a plain narrow lancet. Mr. Ough thinks they were worth preserving.

IMPORTATIONS of timber at the principal ports of the kingdom continue restricted, and on a more limited scale, and this, with the fact that goods are not now pressed on the market to the same extent, helps to sustain prices, public sales being fewer, both here and in the north. At the London sales last week a fair business was done, and prices were a shade better. The trade at Liverpool continues quiet, and without anything as yet to point to an early improvement. At Hull, it is said, there is a fair average trade doing, and the arrivals, especially of white-wood goods, have been small of late. There is a fair demand, and prices are rather against buyers than otherwise. West Hartlepool shows also a quiet but steady trade. The trade at Glasgow shows a more hopeful state of matters. At Leith there is no important alteration. Arrivals at the timber-importing ports in the Firth of Forth last week were again limited.

THE autumn congress of the Sanitary Institute of Great Britain will be held at Stafford, from October 2 to October 5 inclusive. At the first general meeting, which will be held in the Borough Hall, Mr. E. Chadwick, C.B., will preside, and deliver an introductory address on "The need of reform in the administrative organisation of the sanitary service, with special reference to the appointment of medical officers of health." On the second day an address will be delivered by Dr. Henry Day, of Stafford, on "Ozone, in relation to health and disease;" and on October 4 an address will be delivered by Dr. B. W. Richardson. Papers have been promised on sanitary co-operation, the progress of air-testing, the sewerage of ancient Rome, faulty building materials, the administration of public health laws, diseases peculiar to potters, the sanitary defects of old towns, the water supply of Stafford, river inundations, hospitals for infectious diseases, progress in purifying sewage by precipitation, the disinfection of hospital drains, the chemistry of dirt, &c. A conversazione will be held in the Borough Hall, and a public dinner at the Swan Hotel. Arrangements have been made for excursions to places of historic or special interest in the neighbourhood, and for a public luncheon, at which the Mayor of Stafford will preside. An address to the working classes will be delivered, on the evening of the 5th proximo, by Dr. J. Russell, the subject being "Food and Drink."

CHIPS.

The Castleford local board considered at their meeting on Tuesday week fifty-two tenders sent in for the seven sections into which the erection of the new market hall has been divided. The total of the accepted tenders, which are from Leeds, Pontefract, and Castleford firms, amounts to £8,815 7s. 5d.

The foundation stone of a Primitive Methodist school has been laid at Tyersal, near Bradford. Mr. J. Howdill, of Leeds, is the architect.

A new Baptist chapel, erected at the cost of £1,550, and seating 300 people, was opened at Irvine, N.B., on the 11th inst. The architect was Mr. John Armour.

The Hornsey Local Board, at their last meeting, instructed Mr. J. R. Rogers, their surveyor, to prepare plans and specifications for drainage works, estimated to cost £7,000, for obviating the floodings at Crouch-end.

Mr. H. Miller, of Teignmouth, has been appointed borough surveyor of Poole, Dorset, out of 50 candidates.

A new Established church was opened at Bridge of Weir, near Glasgow, on Sunday. It is a plain Gothic edifice, Early English in style, measuring 64ft. by 46ft., and seating 450 persons. The open timber roof is supported on iron columns. The pulpit is at the east end, and before it is a small platform. Underneath the church is a large hall for school and other meetings, and also a session-room and vestry. Mr. Lewis Shanks, of Glasgow, is the architect. The outlay has been about £2,200.

In the Florentine galleries of art irregularities of so serious a nature have been discovered that the Italian Government has seen fit to suspend all the officials, and to appoint Professor Pigorini as a special commissioner for instituting an investigation. Several objects—some of them said to be of immense artistic value—have disappeared entirely.

Mr. C. J. Ferguson, of Carlisle, as local surveyor and architect to the Duke of Devonshire, has prepared a scheme for laying out the whole of the duke's property, on the south side of Carlisle, in a series of handsome streets and terraces. As part of this scheme, the Duke of Devonshire has presented two acres of land on the side of Waterworks-road as a site for the grammar school about to be built in lieu of the old one in Eaglesfield Abbey. The new buildings are to accommodate 250 scholars, and to board 30.

The police commissioners of Forfar have appointed Mr. J. Bailey Denton, C.E., to superintend the laying out of land for sewage purification on Orchardbank, and have accepted the tender of Mr. Bell, contractor, of Gateshead, at £2,937, for constructing a main sewer in brickwork, from Castle-street, Forfar, to Orchard-bank.

The Milton-next-Sittingbourne improvement commissioners have appointed Mr. W. H. Clarke as their surveyor.

On Thursday, the 19th, a new organ chamber was opened at Christchurch, Ilkeston-road, New Radford. The structural alterations have been effected at a cost of £270, by Messrs. Fish and Son, from the designs of Mr. R. C. Sutton, architect, of Nottingham. The organ has been rebuilt by the original makers, Messrs. Walker and Son, of London.

The corner stones of the first Wesleyan church in Stuttgart were laid on the 11th inst., in the Sophienstrasse, in that city. The edifice is from the designs of Mr. W. W. Pocock, of London, and is being carried out by T. Frey, of Stuttgart.

The markets committee of the Court of Common Council for the City of London have been instructed to obtain plans and estimates for the enlargement of the poultry market in Leadenhall.

A new altar of marble was consecrated in St. Ignatius' Roman Catholic Church, Galway, on Sunday. It was designed by Mr Hague, architect of Dublin, and sculptured by Mr. Pearse, of the same city.

The memorial stone of the new Graham's-road United Presbyterian church, Falkirk, was laid last week. Designed by Mr. Alex. Watt, architect, Renfield-street, Glasgow, the new church will accommodate 600 persons; while attached to it are a Sunday school and congregational hall seated for 200, a vestry, and a session-house. The buildings are Gothic. At the north-east corner of the front elevation is a spire 110ft. in height. The elevation to Galloway-street is pierced by five two-light windows, and a side door in the tower; while the last wall has two double light pulpit windows, and a circular trefoil opening, intended to be filled with stained glass. The interior presents an end gallery, and an open roof, with varnished main couples and tie rods resting on stone corbels. The total cost of the church, hall, and other premises is estimated at £3,000.

At a special meeting of the Gloucester and Bristol Diocesan Association, held on Friday, it was stated that while the funds were gradually rising the requests for aid in church restoration or erection were increasing at a faster rate. During the past three years £3,161 had been voted for restoration in the diocese, while the actual cost of the works carried out was no less than £52,679.

The memorial stone of new Congregational Sunday schools has been laid at Castleford. The schools will accommodate 400 scholars, and are being built from the plans of Mr. Hay, of Castleford.

A new pier, erected by the trustees of Sir James Colquhoun, on the shore of the Gareloch, at Boyernick, near Shandon, N.B., was opened at Saturday. The new structure is T-shaped, and is 150 yards in length. It has been constructed of pitch pine, from the plans and specifications of Mr. Copeland, C.E., of Glasgow, at a cost of £1,600. A waiting-room and other conveniences are provided.

Fourteen tenders have been received by the local board of Whitford for the draining of the town. No decision has been arrived at at present.

Mr. Street, R.A., has nearly completed the erection of a church near Wareham, being built at a cost of £30,000 by the present Lord Eldon, as a family memorial.

An inquest has been opened at Melton on the body of James Edward Campbell, aged 39, a retired builder and timber merchant, who was found in a wood shot through the head, and with emptied pockets. Near the body was a discharged Colt's revolver belonging to deceased.

A scheme for the purification of the River Clyde is in course of preparation for the next session of Parliament for the local authorities of Glasgow. Messrs. Bateman and Hill are the engineers, assisted by Mr. Carrick, master of works for Glasgow.

A Sunday schoolroom for 360 children is being built on the south side of St. George's Church, Ovenden, near Halifax. Messrs. Michael Firth and Son, of Queensbury, have taken the contract for masonry, and Mr. W. Gaines, of Halifax, that for joinery.

A new Baptist chapel in Eva-terrace, Ferryside, near Carmarthen, was opened on Sunday week. It is Byzantine Gothic in style, measures 37ft. by 49ft., and is seated for 350 persons. The architect is Mr George Morgan, of King-street, Carmarthen, the joint contractors being Messrs. Mathias, Jenkins, and Edwards, of Ferryside. The cost has been about £1,500.

Christ Church, Cork City, was re-opened on Sunday, after the addition of a chancel, in which is a new organ, constructed at a cost of £300. The structural works have been executed by Mr. M'Mullen, contractor, under the designs of Mr. W. H. Hill, architect, of Cork.

The Croydon School Board have accepted the tender of Mr. J. Smith for the erection of a new school in the Mitcham-road.

At the Oldham Corporation Gasworks a lofty chimney is in course of erection, and has now reached a height of 200ft. On Tuesday morning two men, named Livesey, a bricklayer, and Connor, his labourer, were being wound up to the top to their work, when the rope snapped just before they reached the top, and both men fell and were instantly killed.

Rendham Congregational Chapel, East Suffolk, was re-opened last week, after restorations carried out from the designs of Messrs Smyth and Sons, of Aldeburgh. Messrs. Gibbs, of Peasenhall, were the builders.

The directors of the Conservative Land Society and of the United Land Company, Limited, have appointed Mr. Charles Belton, who has been accountant to the Conservative Land Society for 25 years, and to the United Land Company ever since its foundation, to be secretary to both the society and company, in place of the late Mr. John Ashdown.

At their last meeting the School Board of Guisbro', Yorkshire, instructed their architect, Mr. J. Mitchel Bottomley, of 1, Zetland-road, Middlesbro'-on-Tees, to obtain tenders for the erection of the Northgate Schools, providing accommodation for 800 children, with dwellings for the teachers. The Providence Schools, which are of the same size, were reported by the architect to be progressing favourably.

A new cathedral church is to be built at Oban, N.B., from the designs of Messrs. Pugin, Ashlin, and Pugin, architects, of Westminster.

On Wednesday next, at 6 p.m. the Sketching Club at the Royal Architectural Museum will hold its first meeting this session, and the whole of the sketches made during the past session will be exhibited for the following fortnight at the museum, 18, Tufton-street, Westminster.

During the past two years a residence has been in course of erection by Mr. Williams, contractor, of St. Asaph, in the grounds of the ancient Bronwylfa, near the site formerly occupied by the house of Mrs. Hemans, the poet, in which she lived and wrote. The work having been completed the workpeople were entertained at dinner on Wednesday week.

Christ Church, Accrington, was reopened on Saturday after having been decorated internally with colour, the erection of a new organ, and the fixing of new churchyard gates; the total outlay being about £1,000. The painting and decoration of the church have been executed by Mr. Forster, of Blackburn. The chancel ceiling is divided into panels, each painted a deep sky-blue, and bespangled with stars of various magnitudes, so arranged as as to represent the principal constellations.

The parish church of Yarlington, near Wincanton, Somerset, has been reopened after restoration and enlargement from the designs of Mr. Reeves, of London. An entrance porch and vestry have been added, as well as a north aisle. The chancel has been paved with encaustic tiles, a pulpit of stone, choir stalls, and lectern of oak and seats of pitch pine have been added to the church furniture. Messrs. Farthing and Avery were the builders; the cost has been about £3,000. In the course of the reopening proceedings the foreman of the works, Mr. Avery, was presented with a gold chain and purse of sovereigns.

The rural sanitary authority of Dorking determined last week to erect an infectious diseases hospital, at a cost of £750. The site will probably be at Blackbrook, near Holmwood.

Anent the recent fall of business premises over the river Brun, in Burnley, the Corporation of that town have been urged by the county newspapers and townsfolk to insist on a uniform thickness for internal walls, with the double object of securing stability for the buildings and privacy for tenants. It is asserted that nine-tenths of the dwellings in Burnley have not a greater thickness of internal walls than one brick.

The officers of the 60th Royal Rifles have presented a massive brass lectern to Winchester Cathedral as a memorial of the late Lieut. Col. Charles Williamson. The lectern, which was manufactured by Messrs. Hart, Son, and Peard, of London, has upon the sides the badge of the regiment, and carved upon the book-ledge is the inscription. It has been placed in the nave of the cathedral.

Mr. Thomas Howard, late surveyor to the Denholme Local Board, was unanimously appointed to a similar post by the Thornton Local Board last week.

The Halifax Board of Guardians considered on Friday six tenders for the appointment of valuer for the union, and accepted that of Mr. C. F. L. Horsfall, architect, of Halifax.

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N.B.—DIAGRAMS AND PROSPECTUSES ON APPLICATION.

THE BUILDING NEWS.

LONDON, FRIDAY, OCTOBER 4, 1878.

BRITISH WATERING PLACES.

A PAPER of considerable interest to those who have the welfare of our seaside resorts at heart, was read the other day by Dr. Deville, of Harrogate, before the Yorkshire Association of Medical Officers of Health at that town. The object of the author was to show the defects of British watering places, and to make suggestions for their amendment. Many of the ideas, indeed, Dr. Deville's address contained have been discussed before in our own pages, and must have occurred to many persons who yearly frequent our watering places. Those who happen to be acquainted with such places on the Continent must have especially observed that in many respects of hygienic value we are badly off at home when compared with similar resorts abroad. In the removal of animal and vegetable refuse daily—in the sweeping and watering of public streets and promenades—and in the furnishing with trees of open squares and spaces, our Continental neighbours are certainly in advance of, and more systematic, than ourselves. Though we have administrative machinery we are obliged to admit it does not work effectively nor easily; there are constant hitches, as we have discovered in the operation of the Public Health Act, and the application of the Artisans' and Labourers' Dwellings Act. Our watering places have, as a rule, not been found to be health resorts, and the Registrar-General's quarterly reports have not shown them to stand exceptionally high for salubrity. Thus the mortality was above the average in some places last year, as at Whitby, Southport-on-the-Sea, and Harrogate: while we may mention other watering places, such as Bournemouth, Plymouth, Penzance, Folkestone, Harwich, and many in Wales, where zymotic diseases lurk at certain seasons. Should this state of things continue? Why should our watering places not have a reputation for healthfulness at least equal to that which densely populated inland towns, or Continental spas sometimes enjoy? These questions have been to a considerable extent answered by Dr. Deville. He points first to the better sanitary regulations of Continental health resorts. A medical officer has the control of the drinking water and bathing establishments, the supervision over all lodging-houses and hotels, the dietary provided at public tables, the reception of invalids, &c. He is appointed by some central authority, and is not under the dominion of any local power, or at the mercy of mischievous interference. All schemes are submitted to the central board, which is composed of men competent to judge and estimate the opinions of their officers. On the other hand, in most English watering places animal and vegetable refuse is not regularly removed at short intervals; the street sweepings and garbage are left for days to pollute the atmosphere; street gullies are not cleansed often enough, and disgusting odours contaminate the fresh sea-air of many resorts. The bad ventilation of the tidal-locked sewers is another cause of epidemics, and, as we have before pointed out, it is one almost totally neglected in our watering places. Ramsgate, Margate, Brighton have suffered much from the lack of proper sewerage, though in the latter town at least we have now a fairly perfect system at work. Bournemouth, Bridlington, Torquay, Scarborough, Whitby, Southampton, and some of the Isle of Wight resorts are still imperfectly provided with a system for ventilating the sewers. In some of these places, it is true, remedial measures have been taken, and sanitary regulations are beginning to be carried out with less difficulty; but still we observe a total absence of regulation and control in the equally essential matters of lodging-house inspection, the proper conservation of baths and mineral waters, and the construction and maintenance of hotels. At some of our best watering places the lodging-houses are miserably defective in sanitary necessaries; perhaps two or three old dwelling-houses have been turned into a boarding-house by making a few openings in the party walls, and by the extension of premises in the rear; the old water-closets, bad in construction and ventilation, are probably closed in on all sides; or, lighted by cramped areas, in some cases they actually ventilate into passages or rooms; the kitchen and offices are unhealthy and low, the storage-room for food dark and damp; and the whole interior is poisoned by pestilential emanations from imperfect drains and sinks. Hotels are planned and constructed under no sanitary control, and some of the most costly and ornamental of these buildings are little better than fever dens. Another striking instance of the want of care for health is mentioned by Dr. Deville, though many visitors to sea-side resorts must have noticed it. "He had known in a watering place some of the inhabitants unable, either for love or money, to get their ash-pits and midden heaps cleaned out for months together, and the putrescent mass was allowed to seethe, rot, and stink at their back doors, whilst the local board insisted, in the case of new houses, that these places should be twice the size of the existing ones." Then, in some of our sea-side towns, the pollution of drinking water is notorious—the waste-pipes of cisterns are brought into connection with the air-bound drains; only one cistern is provided for both dietary and flushing purposes, while wells are polluted from a variety of sources. One of the greatest deficiencies of the English watering place was, Dr. Deville remarked, the absence of any fever hospitals or *maisons de santé*. "In most towns of importance on the Continent houses were maintained by the municipal authority, or by medical men, for the reception of invalids, and for the treatment of their various maladies. This was a great boon to a watering place, where persons were occasionally taken suddenly ill. On fever or other disease manifesting itself, the suffering persons could be at once isolated and well nursed in special public or private institutions." In speaking of the possibility of providing remedies for these defects, Dr. Deville dwelt on the importance of the inspection of all lodging-houses—a suggestion before discussed in our columns, and now accepted as a fundamental requirement to be insisted on in all future legislation—and upon the absolute importance of giving the medical officer all the power possible for the discharge of his duties. It will, indeed, be remembered that Dr. Deville won a victory about a year ago over the Harrogate Commissioners, who attempted to interfere with the free expression of opinion of their officer in relation to this very matter of inspection, and we are quite disposed to admit that medical officers should not be at the mercy of the caprice, prejudice, or ignorance of local authorities. To meet the evil from the importation of infectious diseases, Dr. Deville recommends the provision of a house isolated, with disinfecting chambers; he also suggests hotels for invalids, where the dietary should be strictly regulated by the medical directors, and where the administration is carried out more in consonance with that of the Continental hotel, which is literally a boarding-house without drink. Hydropathic establishments he regarded as a result of the present hotel system, which encouraged the consumption of wine and spirits, and those who imbibed them, and which adopted a tariff from 20 to 40 per cent. in excess of equal accommodation in similar places abroad.

While fully agreeing with many of the suggestions made by Dr. Deville, and believing that some central authority is required to watch over the exercise of the functions of local bodies, we are not disposed to regard the amelioration of the present objectionable conditions of many of our health resorts as impossible except under the despotic rule of an irresponsible Government Department.

SUNDAY ART EXHIBITIONS.

A SMALL beginning has been made by the Sunday Society in the gallery at 33, New Bridge-street, Blackfriars. The success attending the opening on Sunday of the Grosvenor Gallery induced the society to arrange for a series of loan collections, and the interesting drawings in water colour, illustrative of Swiss life and scenery, by Mr. William L. Thomas, to be opened for view on the first three Sunday afternoons of the present month, cannot fail to strike the most scrupulous upholder of the "day of rest" as belonging to the legitimate objects which the society is seeking to promote. Sunday reform, as all our readers are aware, has long been regarded by the over-righteous as the battle cry of secularists. One by one, however, the arguments used for the closing of public institutions—such as museums, picture galleries, and gardens—on Sundays have given way before the common sense and enlightened views of those classes for whose benefit they were intended, and in 1875 the Government favoured the movement by adopting a resolution that it is expedient that places of rational recreation and instruction should be opened to the public after the hour of two o'clock p.m. The objects of the Sunday Society are simply to obtain the opening of museums, art galleries, libraries, and gardens, and to extend to the whole of the community the advantages now enjoyed only by a small section of it. We have only to turn to the society's third annual report to see that, in spite of impediments, the efforts made to remove obstacles raised by bigotry and prejudice are gradually enlisting support from some of the most thoughtful and distinguished men of the present century—a fact that a glance at the names of the members will show. The present report records the additional names of the Duke of Westminster, Earl Rosebery, Hon. L. C. Dundas, Professor Fawcett, Sir Harcourt Johnstone, Fred Leighton, R.A., L. Alma Tadema, A.R.A., S. F. Watts, R.A., and Rudolf Lehmann, who have joined the society. Legislative action only is needed to supplement the society's efforts and to carry out a reform which must commend itself to all who wish to elevate the tastes of the working and restricted classes of the community, and to secure a more intelligent observance of Sunday.

The exhibition is to be opened free during the present month by tickets, which will be issued to those applying by letter to the honorary secretary, Mr. Mark H. Judge, 19, Charing-cross.

Let us briefly note a few of the pictures, which are all original sketches made in Switzerland. Perhaps the "Leaves from a Note Book," of which there are several, will interest many by portraying the simplest elements of Swiss life. Studies of figures, fountains, scenery, customs, and odd bits, fill up these frames. "Waiting for the Priest" (2) is an interesting example of Mr. Thomas's powers as an artist. Here is a young girl, with an air of expectancy in her

face, sitting in a porch, dressed up for a procession — the feature of most interest being the headdress, made of beads, flowers, and tinsel. A "Peep through the Clouds" (9) is a thrilling sketch, showing a locomotive pushing up a carriage through a cloud—a no uncommon sight to passengers who have travelled by the Righi Railway. "In the Ferry-boat, Lake Thun," is a sunny sketch — a boat rowed by women, screened by a canvas awning from a powerful sun, such as one sees in Switzerland. Sunsets from the Righi and on the Lake of Geneva, are clever studies of the marvellous effects of sunlight upon the Alpine atmosphere. We particularly notice some charming pieces of atmospheric effects, such as a rainy day, Lake Lucerne, "First Glimpse of the Sun" (29), "First Glimpse of the Sun on Mont Blanc" (30), "Effect of Falling Rain" (36), "Clouds and Snow Peaks" (31), "Sunrise on the Righi" (40)—a small but striking piece. The artist says, "a quarter an hour before the sun rises a fiend in the shape of "boots" goes all along the corridors of the different hotels, and blows a fearful blast on a cow-horn. Everybody tumbles up, and as there is a notice over each bed that the bed-clothes must not be taken, we may imagine the extraordinary costumes in which people turn out to see the great show—"the rising sun." "From the Righi" is another attempt to give a view from the top of the mountain. The effect of height is exceedingly difficult to depict in water colour, though the artist has done his best to give us here an idea of the prodigious depth of Lake Zug, which lies 5,000ft. beneath, of the fleecy clouds creeping along, throwing long purple shadows across the valley, and the varied tints of the mountains. The setting sun from the Murren is another favourite theme of the artist, and in No. 67 Mr. Thomas gives a "faint notion" of the glory of the setting luminary on the "Eagle," the "Monk," and the Jungfrau—the grandest mountains of the group. "Morning and Night from the Matterhorn" (63 and 64) is another striking sketch of this precipitous mountain. The morning view shows the steep escarpment of the rock, of a beautiful rosy hue, while the night changes the colour to a deep inky tint. "Sketch from the Riffelberg" (59) is taken from a point above 8,000ft. in height. Patches of snow are varied by bright wild flowers, and close to this glacier-clad alp, says the artist, is a large hotel with every comfort, making up 100 beds, with electric bells in every room, a telegraph wire to Zermott, 3,000ft. below, and also a small church. Mr. Thomas gives the visitor an idea of a "Snow-storm" (76) in the Alpine peaks, and in No. 102, a "Glacier in Mont Blanc" (78), "First Glimpse of the Sun" (30), the "Lower Glacier, Gundelwald," the "Matterhorn," an "Alpine Forest" (88), with its group of pines. "Cedar Pines" (94) is a charmingly-rendered sketch, showing a pathway through a forest of pines, their stems toned with red, and the crimson Alpen rose-blossom on the grey rocks, with a dazzling white snow mountain behind. We may note also, of architectural interest, a "Covered Bridge" (15), the "Cathedral, Basle" (57), "Entrance to Lucerne Cathedral" (62), the "Castle of Chillon" (74), immortalised by Byron, a "Roofed Bridge" (95), an interesting sketch of the covered wooden-constructed bridges so common; the "Old Swiss Town of Unterseen (91), a "Monk's Garden" (100), the "Old Religious Houses, Interlaken" (109); but Mr. Thomas excels rather in the landscape, and in giving the varied effects and iridescent hues of a clear atmosphere, only appreciated by those who have travelled in Switzerland.

We recommend those who can spare an hour or two, or who do not know how to spend raitonally the leisure hours of Sunday afternoon, to visit the Sunday Society's art gallery of water-colour sketches of Swiss scenery, and we are sure they will come away interested and better informed about a region which only the wealthy London merchant or professional man can visit. The Sunday Society endeavours to place before the intelligent artisan the intellectual pleasures of art and science accessible now only to those who can visit museums and galleries every day, and who can purchase the privileges all should endeavour to possess.

A CHAPTER ON SOME KINDS OF TIMBER.—III.

THE transition from oak to fir in English carpentry was of a two-fold nature, involving both the substitution of one wood for another, and the displacement of a native by a foreign production. Under ordinary circumstances, as one became scarce, costly, and inconvenient, the other would take its place, but there was an impediment to so simple a mutation where carriage by sea intervened. Henry III. had agreements with the kings of Norway, and some deal boards were imported at the time. This shows the commodities to have been already in repute, but piracy was too common to allow of settled intercourse. England, too, so far from feeling a deficiency, was rather an exporter of timber for generations afterwards. The Hanseatic League, formed to resist buccaneers, became a powerful confederacy. Edward IV. renewed their privileges here in 1474, and in return obtained freedom for the English to trade in the Baltic, especially in the port of Dantzic, and in Prussia. "Cofyns of fyree" are mentioned for the carriage of this king's books to Eltham in 1480; but whether home grown, or a consequence of the treaty, does not appear. Some limitations were imposed by Henry VII., and further by his son. Bringing in timber, indeed, seems to have been a ground of accusation in 1517, though it also indicates an opening market. The disastrous expedition of Sir Hugh Willoughby led to the knowledge of Archangel in 1554; and the chartering of the still existent Russia Company, two years later, by Philip and Mary. No other Muscovite port appears to have been open until St. Petersburg was founded in 1703. The progress of the English marine was such that Elizabeth abolished the monopoly of the Hanse merchants in 1597; but Holland stood at the head of commerce and navigation for a century later. Though apparently contraband at the time—and Harrison had a few years previously deplored the disuse of commoner woods, saying, "the wals of our houses on the inner sides be hanged with tapestry, arras-work, or painted cloth; or els seeled with oke of our own, or wainscot brought hither out of the east countries"—the fitness of fir was set forth in 1586; and before the century had closed deal panels were introduced in the wainscoting of Boughton Malherbe, near Ashford, Kent—a place remembered also for its decorative paint and arabesques. The necessity for a supply of fir must have been especially felt when cottages and homesteads were rising throughout the land, and the increase of the metropolis was, from its rapidity, termed an inundation. But instead of supplying the want by the free introduction of sea-borne material the legislation of the time aimed at the repression of building, and forbade the division of large houses into more numerous and convenient tenements.

Part of the paling at Richmond Palace (where Elizabeth died March 24, 1603), was of deal; and at Wimbledon House, erected by Sir Thomas Cecil, 1588, was a paling of deal boards. Some interesting particulars of this sumptuous manor-house are printed by Mr. T. H. Clarke from a survey in 1649. A gallery on the ground floor was "seeled overhead, pillored and arched with gray marble, waynscotted round with oake waynscott, varnished with greene, and spotted with starrs of gould; and benched all along the sides and angles thereof." The chapel is described, and "the lower parlour was waynscotted with oake, adorned with starrs and cross patees of gould." On the first floor was the great gallery, 109ft. 8in. by 21ft. 1in., "floored with cedar boards, bordered with fretwork, and waynscotted round, 13ft. 6in. high." The summer chamber, 45ft. by 20ft., was also floored with cedar. The substantial nature of this edifice (combined with contemporary events) makes it probable that the deal floors were original, as well as the parquetry borders, an Italian invention of the fifteenth century, supposed to have been first seen here at Somerset House. By 1638 Germany, Prussia, and Norway were busily engaged in the supply of deal. But the sagacious Raleigh had represented to James I. the advantages of commerce, as seen in the example of Holland—a country with no natural produce to export, nor a piece of timber fit for shipbuilding, but receiving its deals out of Norway, and its masts both from that country and Muscovy. The same idea possibly induced Evelyn, later on, to say, "I will not complain what an incredible mass of ready-money is yearly exported into the northern countries for this sole commodity." The supply during the Commonwealth had not been so plentiful as to remove the character of rarity from deal boards, and Sir Bulstrode Whitelock, ambassador to Sweden, on his return in 1654, brought a cargo over for use in the floors and wainscots of his mansion at Fawley Court. Cromwell, at home, and Louis XIV. in France, had pondered over the commercial intercourse of nations; and Charles II., in the first year of the Restoration, prohibited the Dutch trade in boards and timber. The first navigation law of sterling importance was now issued, and the direct communication with timber-growing and other States made a national purpose. But it was not till 1701 that a nautical census was taken, when it appeared that 3,281 vessels, carrying 261,222 tons, 27,196 men, and 5,660 guns, constituted the commercial navy of all ports of England and Wales. Thenceforward, allowing for the occasional sway of political, colonial, and fiscal considerations, all has been progressive to the stupendous proportions of the present concurrently with the increasing scope for foreign fir, attention appears to have been directed to the planting of exotic sorts. The timber of the spruce (*Abies excelsa*), yielding white deal, has for time unknown been obtained from Norway in small entire trunks suitable for scaffold-poles and other uses. It is mentioned in Turner's "Names of Herbes," 1548, and has since been cultivated here. It is less resinous than *Pinus sylvestris*, but more lofty. An example in Studley Park, near Ripon, said to have been planted by Eugene Aram towards the middle of last century, measured 132ft. in height, and was between 6ft. and 7ft. diameter. The Stone Pine, a native of Greece, where its height is 50ft. to 60ft., and the large trunk is free from branches below the spreading parasol-like head so frequently seen in Turner's "Pictures of Italy," was introduced in 1548, but the British climate is unsuitable, and the tree degenerates into a mere bush rarely higher than 15ft.

The Silver Fir of Siberia and Germany, introduced in 1603, is considered by Loudon the noblest of its genus and the only species worth growing in England for timber. Two planted in the year of intro-

duction at Harefield Park, Middlesex, were "goodly masts" in 1679. One was 81ft. high to the upper bough, though the growth was impeded by a forked top. It was 13ft. round at the base. In the middle it was 17in. square, and at a height of 73ft. it was 6in. square. This tree contained 146ft. of timber, and the other would probably have surpassed it but for accidental injury by fire.

Selby speaks in high terms of the larch, a native of the Italian Alps, deriving its name from "lar," the Celtic for fat. It produces resin plentifully, and resembles the fir in cones and leaves, but is deciduous. It is referred to in Parkinson's "Paradisus," 1629, and has been in Scotland since 1727, when some plants were found in a consignment of orange trees from Italy. After sickening in the stoves, they were turned into the open garden, and manifested such natural vigour as to induce extensive operations. The author regards as fortunate an incident "which has given to the nation a species of timber, scarcely if at all inferior to the oak, even for naval architecture; and superior to any other wood we possess for all purposes where strength and durability, under the most trying circumstances, are required." It had the prospect of extensive use in Scotland and the neighbouring parts of England, and began to be used in ship-building on the Tay in 1809. The more recent experience of Mr. Laslett, however, is that it warps and twists too much to be easily kept watertight. The Cedar of Lebanon has a close resemblance to the larch, but is evergreen. It was introduced before 1683, and has, therefore, had time to assert itself as a magnificent and grandly picturesque object, but producing wood of inferior quality and durability. Thomson, the poet, had a dwarf example in his grounds at Richmond, affording no image of the "lofty pines" referred to in his description of the "Tivoli of London."

These instances show how great an interest the subject of planting has awakened. The example of the Duke of Athol, at Dunkeld, has been imitated, though in reduced proportions and more ornamental form, by other enlightened proprietors. The Commissioners of the Royal Forests are also in action, and despite occasional disappointments there must eventually come out results of public value. The absence of any general pretension to the patriarchal endurance of other trees is simply a difficulty. No individual fir can be pointed to like the chesnut of Tortworth, or the yews of Skelldale, as the connecting chain of many ages. But Dr. Plot mentions one in Staffordshire, 150ft. high, "which some think of spontaneous growth, besides several more so irregularly standing as shows them to be natives." Evidences, indeed, are sufficiently convincing of continuous existence to warrant the belief that where the order once flourished it will thrive again. It cannot, indeed, be contemplated that this country, with a vast demand and limited area of production, will ever be independent of Russian and other boundless forests of the Continent. Yet a change in English dendrology is, undoubtedly, on foot, and in proportion to the judgment exercised in its direction will be the benefit of the transition. The habitat of the fir is wide, and its sustenance conditional; but as the oak of Britain has been nowhere surpassed, it must be the planter's care to find conifers for which the soil and climate of our wastes are suitable. Nor should the task be difficult, seeing that pines flourish all over northern Europe, and produce the best and hardest wood by slow growth in cold, exposed situations. Indeed, the name "Pinus" is sometimes held to indicate the preference of the tree for hills and rocks, and to be cognate with the Celtic *pyn*, which survives in the names of British towns, as Pen-ryn, Pen-maen, &c. No elevation under 1,000ft. from the sea level would be too great for the species. As openings occur the planter will do well to remember how Mason, in *The Garden*, answered the demand—

"Is there still
A void? Lo, Lebanon her cedar lends,
Lo, all the stately progeny of pines
Come with their floating foliage richly deck'd,
To fill that void!"

THOMAS MORRIS.

DECORATION OF THE CITY TEMPLE, HOLBORN VIADUCT.

THE interior of the City Temple has been recently decorated in colour by the firm of Messrs. Phillips and Son, of Baker-street, and the edifice was re-opened for public worship last Sunday. The building, designed by Messrs. Lockwood and Mawson in the Roman style, certainly lacked the aid of colour on some of its details and surfaces; the segmental ceiling in one span, divided into eight panels, seemed especially to want the aid of decorative treatment, and there was a cold—almost depressing—look about the whole interior, with its large surfaces of plaster, that demanded a certain amount of colour to realise the effect of the architect's work. The artists employed—Messrs. Phillips and Son—have boldly essayed a general scheme of polychromatic decoration that calls for more than a passing allusion. Visiting the edifice, we find the main ceiling, which is divided by long, narrow panels, has a predominant neutral or olive ground, relieved by a warm cinnamon and blue on the margins, the enriched details being brought out in tempered red and gold. The effect below, especially when the gas is lighted, is harmonious; and we are pleased to find that some of the rococo enrichments in the panels have been judiciously subdued rather than rendered conspicuous. The cornice has been treated with a gradation of colour, the projecting members with cinnamon and shades of the same hue, the recessed parts being of a colder tint as blue between the trusses. Below the cornice of the principal ceiling we have the clerestory, the spandrels of which have been diapered in cinnamon and green hues, and the only fault we find is the rather strong and glaring colours in the semicircular windows, which scarcely appear to be subordinated enough. Coming to the galleries we find that those very intractable features of a building are coloured with neutral tints of umber, olive, and grey, relieved on the fronts with blue and gold, used sparingly. No garish colours nor white obtrude; the gallery ceilings are panelled in two hues of neutral olive, the margins and flat ornaments being in darker tints. We observe that the columns are painted of a deep chocolate or Pompeian brown, the caps are gilded in the foliage, and the bell, or background of capitals, is coloured of dark blue. One point particularly struck us. The upper part of the moulded or fluted shafts is enriched by gilding some of the flutings of this portion, and also adorned by bands of cinnamon and blue. The object of this treatment is probably to lighten the upper portions of the shaft, and to avoid the abrupt termination of the deep colour of the shaft against the gilded capital—the treatment, though open to criticism, has at least an artistic reason in its favour. Glancing at the walls we find the prevailing tint—cinnamon hue—has been adopted, the stiles of the panels being lined with umber and ornamented with a grey fret of simple pattern. The cross beams and soffits of those carried by the columns are gilded and painted in a delicate vellum tint upon a ground of umber, the effect being quiet and telling. The pulpit, given by the Corporation, has been finished in white and gold, inlaid marble panels adorning the sides; the organ has been ornamented with colouring, though we cannot say in the best taste—on the contrary, it rather injures other portions. We notice also that the windows are to be filled with painted glass, and a filial memorial window to the Rev. James Richards, D.D., of the United States, who died in 1871, is already inserted in one of the aisle windows on the west side. Messrs. Phillips furnished, we understand, the general designs for this and the clerestory windows, and Mr. Hensman was the artist who prepared the cartoons. In the lower window the subject depicted is the Sower—the words, "Behold, there went out a sower to sow," being introduced below. The figure and sunset background have a very rich effect, and the drawing and general design of the borders are in keeping. The semicircular head of the window has the Royal arms and those of the States. Along the principal frieze below the clerestory windows are inscribed the names John Howe, Charles Wesley, Oliver Cromwell, Richard Baxter, John Bunyan, and Anne Askew, upon a background of tempered blue or verditer. The polychromatic effect has been studied by reference to gaslight, and the effect is certainly more harmonious under it. The artists have avoided the extremes of ecclesiastical and music-hall effects, and have preserved on the whole a subdued and pleasing harmony of tints of a low scale of colour. We cannot overlook the somewhat difficult task placed before them—polychrome decoration has always been an experiment in England. The architectural detail and ornamentation of the building are of a doubtful and by no means classically pure type; the white and glaring windows certainly have a killing effect; while the whole of the seats, stained and varnished, present a predominant colour that somewhat spoils the effect. With these elements to contend against Messrs. Phillips have produced an effect that will compare at least favourably with other polychromatised interiors of the class in London, or with other works they have executed—such as St. Andrew's, Holborn, Marylebone, or Kennington churches. We believe the cost of the decorations has been something over £2,000.

THE SANITARY CONGRESS.

A SANITARY Congress is being held this week at Stafford, from the 2nd to the 5th inst., both days included, under the auspices of the Sanitary Institute of Great Britain. The first meeting of the council and local committee was held on Wednesday, at the Guildhall, at 1 p.m., for the despatch of business. The council also meet to-day, at 1 p.m., at the Guildhall, for the further despatch of business relating to the institute. Addresses by Mr. Edwin Chadwick, C.B., Dr. Day, and Dr. Richardson have been, or are to be, delivered in the Borough Hall. Dr. Russell's address to the working classes on "Food and Drink," will be delivered in the Borough Hall to-morrow evening at 8 o'clock—a few numbered reserved seats one shilling each. In his opening address Mr. Edwin Chadwick dwelt at some length on "Failures in Sanitary Progress," giving some normal instances of the power of sanitation, demonstrating the costliness of ignorance of sanitary science, and the need of securities for competent sanitary administration. From his exemplification of prejudicial failures in sanitary works we take the following:—"I beg, as accounting for the want of progress in the reduction of sickness and death-rates, to present some examples of how far it has been from being done in works in which there has been vast expenditure. Take the sanitary work required for the supply of the population with water. An engineer being applied to by uninformed local authorities usually does very much as he chooses; and he chooses, perhaps, some river source, and collects the water in an open storage reservoir, where it stagnates for a time, and where it imbibes vegetable and animal impurities which have afterwards to be taken out by filtration—in which he only succeeds in part—and then he takes it in mains to the centre of the streets; and there he leaves it: he has done all he pretends to do. From thence, by private service pipes, it is carried into the houses with every variety of ignorant defect, generally at excessive cost to the consumer. We find that the water so collected and transferred in main pipes was commonly delivered to the consumer on the intermittent system, as in London, where it is left in butts and cisterns, where it stagnates, and in the close courts and alleys near cesspools, and putrefying heaps of refuse, where it absorbs the mephitic gases, and is made unfit for drinking. A health officer in one of the districts of the metropolis, who has passed through such an examination as it is proposed to make

general, has analysed the water collected from one of the purest of spring sources, but subsequently left under the conditions I have described in the midst of the lowest class of habitation. An analyst finds that the water is then positively dangerous to drink, and the people for whom the pure sources of water supply was intended, have been led to quench their thirst with fermented or alcoholic beverages. Then there being no interest in seeing to the prevention of waste, or that there are proper fittings, the waste is enormous, and there being no proper means by impermeable channels for carrying away the fouled water from within the house or from beneath the site, from defects of permeable or badly-jointed drains, is supersaturated and excrement-sodden —the absorbent walls of the houses are made damp, and the health instead of being improved, as promised, is made worse. We ascertained in London at the General Board of Health, that such injurious waste of water amounted to three-fifths of the quantity pumped in, and that the deaths from fever and cholera varied very much in the degree in which the subsoil at different levels of the metropolis was supersaturated. It is only recently that the forewarned results of these defects have been perceived by sanitary officers, and in different towns efforts are being made to reduce the pernicious waste, as at Liverpool, for example, where it is reported that they have done so with a great reduction of the damp of the sites and of the walls of the houses, followed by an important reduction of the death-rates, caused or aggravated by the damp. And then, as to the channels required for the removal of fouled water.

"In 1848, we had trial works made as to the forms, sizes, and inclinations of channels serving for houses and sewers that would be kept clear of the stagnant deposit, that would emit no putrid emanations, and would be constantly self-cleansing with their own discharge of water. We got the deductions applied, and successfully demonstrated to blocks of buildings. There was then no proper authority, if they knew of these results, that was responsible for applying them. Architects and engineers, ignorant of them, continued to adopt 'man-sized' sewers constructed so as to allow men to go up them to cleanse them, and being so constructed, they impeded the outflow of the sewer water and created the stagnant foul deposit which men were sent up to clear out. We found under the seat of the Imperial Legislature, the new Houses of Parliament, an evaporatory surface of some hundred ordinary cesspools; and these were communicated with from without by the large man-sized sewers. At the time of the Chartist outbreak, information was got of a plot, to get at the Parliament House, through these sewers, and from them to get access to the Government offices, and blow them up, which might have been done, and which as to the Government offices might probably be done now. They were like the mining works of a besieger ready made for the service of an enemy. In Paris such sewers have been constructed with strategetical purposes. I, with an engineer officer, Sir H. de la Beche, was charged to take measures of security, which we did for the time. We agreed also upon a plan in conformity with the demonstrations of the trial works, in which there would not have been a man-sized sewer, with such conveniences for crime, nor for the generation of the various gases, in the whole of Westminster proper, and that plan included the re-drainage of as much of the houses as might be found wanting. It was, indeed, the fragment of a measure for 'sending the rainfall to the river, and the sewage to the land'—where it must yet be sent! But now each day's sewage has been sent to sea, or rather to drift to-and-fro in the tidal tract of our great metropolitan river. Every well-determined condition for preventing this vast waste and parent of evil has been ignored, has been set aside by the influence of insanitary engineers. Their alternative was and now lamentably is in great tunnel sewers (into which they would collect storm water, that on a separate system we proposed should alone go into the river). They have constructed there a tunnel sewer more than a mile in length, and at six times the expense of the 16 miles of self-cleansing sewers which we had projected, the alternative resulting in what is little better than an extended cesspool, giving off sewer gases into the streets and houses, and into the public offices. Recently, from the drains and the sewers of these false principles of construction the new Government offices have been subjected to the invasions of noxious gas from within the building as well as from the outside sewer of deposit, to such an extent that some fevers and two deaths at the Colonial-office have been ascribed to them. Such vicious constructions pervade the whole of the metropolis, including bad drains within the houses as well as the sewers of deposit communicating with them. Deaths ascribed to them have occurred in the Colonial-office and in the War-office, and fevers at Marlborough House. In certain atmospheric conditions the smell from stagnant putrescent matter in the metropolis is unbearable. So general are the conditions arising from errors in the principles of sanitary construction that they are assumed to be constant and unavoidable; and so invention is everywhere directed to the means of trapping and ventilation to ward off the gases generated in them. From the discovered dangerous defects common to new as well as to old house drainage works, a speciality in sanitary science has been created of professional experts who test such work in houses and provide remedies for their defects, and an association for mutual protection, to get the works tested, and to maintain them in a safe condition, has been started at Edinburgh by Professor Jenkins, and a similar provision is being made for the protection of the members of the National Health Society of London. From the evils experienced from unskilful and disconnected work of water supplies without due provision for the maintenance of its purity in houses, and the prevention of noxious waste—from sewers unfitted to drains, from drains unfitted for the connection with sewers, a perception has been arrived at of the general applicability of principles which have been carried out of unity of works in towns where a marked reduction of sickness and death-rates has been effected."

The remainder of the address dealt with the recent advance of modern sanitation, and the need and requirements of sanitary officials.

We may give abstracts of some of the sectional papers read in a future number should space permit.

THE CHURCH CONGRESS AT SHEFFIELD.

THE eighteenth Church Congress was opened on Tuesday at Sheffield, this being the third time the assembly has been held in Yorkshire. Supplementary to the Church Congress proceedings is an Ecclesiastical Art Exhibition at the skating rink, Glossop-road, under the management of Mr. J. Bray. In an ante-room are displayed many drawings, including pen-and-ink sketches of churches and interiors; also coloured interiors, chancels, and altars, and designs adapted for new churches.

Mr. Hayball, of Sheffield, exhibits the carved pulpit intended for Bradfield Church. It has a crocketed canopy, is ornamented with Gothic tracery, and the panels are painted by Mr. W. F. Dixon, of Wharncliffe-chambers, Sheffield. Mr. Hayball also exhibits a communion chair for St. Mary's Church, Sheffield; a carved chair and a font in mahogany for Carver-street Chapel, and a book of photographs.

There is a large and varied display of articles in brass. Messrs. Chubb and Son, St. Paul's Churchyard, have sent a large variety of works in brass, the principal being a fender in the Queen Anne style, with medallions in "Coventry bronze," representing the four seasons, cabinet fittings in the same material, an elaborate gas standard, &c. They also show a great variety of large and miniature tile cartoons, with Scriptural and other designs. Messrs. Jones and Willis show a lectern, modelled from the well-known ancient example in Southwell Minster, brass reading stands, &c. Messrs. Cox and Sons have also a brass lectern, circular candelabra, gas standard, and similar work.

In stained glass there are some good specimens. Messrs. Camm Brothers, Birmingham, exhibit the stained-glass window in memory of Mrs. Thornhill-Gell, for the church in Stanton-in-the-Peak, contributed by the Rev. Hamilton-Gell. Messrs. Gibbs and Howard, London, have on view a reredos for Walsingham Church, from designs by Mr. W. E. Nesfield, and also painted tiles, delineating human figures, life-size, for proposed memorials, together with examples of some good stained glass.

At the head of the exhibitors of fabrics are, as usual, the sisters of St. Margaret's Convent, better known as the East Grinstead School of Embroidery. Three most interesting articles are a hood, a cope, and a banner, lent by the Rev. J. Edwards, of Prestbury, and which came prominently before the public in connection with the Prestbury ritual case. The banner especially contains some very fine needlework etching in silk. The subject is "The Annunciation." Several altar-frontals of great beauty and design, also the work of the sisterhood, are exhibited. There is one designed by the sisters from Fra Angelica, and representing a triumphal march of angels. This cloth belongs to St. Margaret's Chapel, and was presented to the sisterhood by an associate. Another is a white embroidered frontal of our Lord with angels, lent by Lady Ripon. This was worked by the sisters from a design by Sir Gilbert Scott. Another leading feature is a serge banner belonging to the Acton Park Sunday School, lent by Lady Cunliffe. There are also a number of copes, chasubles, palls, and banners belonging to the convent, all exquisite in workmanship, and most of them chaste in design. Amongst the smaller articles is a banner covered with small pearls, and representing the meeting of Melchisedec and Abraham. There are also a number of chalice veils, burses, &c.

In the way of tiles, Messrs. Minton, of Stoke-on-Trent, are well represented, and Messrs. Powell and Son, of London, have a large number of mosaics. A most interesting contribution to the exhibition is a number of drawings of ancient brasses to be found in the various churches and colleges throughout the country. Some of these are very old and of great historical and art value.

BUILDERS' CLERKS' BENEVOLENT INSTITUTION.

A SPECIAL general meeting of the subscribers and friends of this institution was held at the offices, 27, Farringdon-street, E.C., on Tuesday evening, the 24th September, Mr. Thos. F. Rider, president, in the chair, when Mrs. Hannah Wade was duly elected a pensioner on the funds, and a resolution for increasing the annual pensions from £20 to £25 for men, and from £15 to £20 for widows was carried almost unanimously.

Previous to the passing of the latter resolution, Mr. Rider said: In urging for this proposed increase in the pensions I wish particularly to point out the greatly increased cost of living since your institution was established ten years ago, and that the Builders' Benevolent Institution, upon the model of which your own was formed, have recently increased their scale of pensions upon the same ground. I hardly know whether the fact of our having only one candidate for the vacant pension who has this evening been elected is a subject for congratulation or not—on the one hand it may prove there is not much destitution at the present time among builders' clerks, or it may prove, as I more fear is the case, that your institution is not sufficiently known throughout the trade to bring before us all the cases eligible for the assistance we have such satisfaction in giving. Your treasurer reminds me that it is no part of the duty of an institution to seek for candidates, but to attend to the relief of such as seek its aid. Still I am very desirous that this institution should be known in every builder's office in London. I am well aware that the increase in the amount of pensions will necessitate increased exertion on our part to provide the funds to meet it, but I would not have you at all timid on this point. Attend well to the relief of the necessitous, and you will have a strong case in appealing for new and increased subscriptions. I notice the same occurs in your orphan fund, and that there is only one candidate for the presentation you are about to purchase in the Orphan Working School, which may arise from either of the

causes I have alluded to, and which question will, I trust, be satisfactorily solved by the advertisement your secretary is about to put forth about it.

At the close of the meeting the following sums were announced:—Mr. T. F. Rider, £10 10s. donation and £1 1s. annual subscription; Mr. E. S. Rider, £5 5s. donation; and Mr. Charles Knock, £5 5s. donation.

ANNUAL REPORT OF THE SCIENCE AND ART DEPARTMENT.

We have before us the 25th annual report of the Science and Art Department of the Committee of Council on Education. A marked decrease is noted in the number of science schools—viz., from 1,426 in 1876 to 1,348 in 1877, and of scholars from 57,988 to 55,927—a decline entirely due to the substitution of physiography for physical geography; but notwithstanding this circumstance there was an increase in the numbers examined, from 33,289 to 35,342. The number of papers worked and passed and of first-class passes were less than in the previous year. For the Whitworth scholarships 69 competitors entered, of whom 19 of the most successful in the theoretical subjects were admitted to go forward to the examination in practical workmanship, held at Messrs. Whitworth's workshops, Manchester.

Under the art division of the report it is stated that during the year 41 students in training to become art teachers, and 14 national scholars in training to become designers or art workmen, received allowances to enable them to study in the school and museums; 20 students were admitted on payment of half-fees, and 98 others, including students in training, national scholars, and 17 men from the Royal Engineers, received gratuitous instruction. Five students in training were appointed as masters of schools of art, and 21 training-school students obtained certificates for payment as art teachers. New schools of art have been established in 1877 at Barnstaple, Doncaster, Keswick, and Weymouth. The total number of schools throughout the kingdom is now 144, and of students, 29,414. The annual increase in the work done in the schools and branches continues to be maintained. At the annual examination in April, 1877, 18,131 students submitted 138,199 drawings or models; in the second grade drawing examinations 4,692 students were successful, and 1,392 obtained prizes. 790 works were selected for national competition—against 1,230 in 1876. The number of students in art classes was 29,579 in 910 classes, 23,767 elementary schools, 549,010 children were taught drawing, and 403,208 were examined. The amount of grants in aid of this elementary instruction shows an increase of £5,901 6s. 11d. on the previous year. At the 47 training colleges 697 students obtained certificates for drawing. The grand total of persons taught drawing, painting, or modelling, through the agency of the department, was 610,620, against 530,412 in 1876, and 449,689 in 1875.

The report as to South Kensington Museum announced that, owing to the reduction of the purchase vote, the acquisitions made during the year were not numerous—the principal objects obtained were two Limoges enamels by L. Limousin, a triptych by Penicaud, and some specimens of majolica. Amongst the numerous donations may be noted a collection of Persian carpets and other textile fabrics given by the Shah of Persia, and an enamelled terra cotta panel of early Berlin work from the Crown Princess of Germany. Noteworthy loans are those of the Troy collection of Dr. Schliemann, some old Greek glass, and Lord Beauchamp's collection of miniatures. The additions to the reproductions' collection comprised a selection of electrotypes from Italian bronzes in the museum, and from examples of Persian metal-work, and in plaster of the font in St. Bartholomew's Church, Liège, and of the two Cantorie, originally in the Duomo at Florence, respectively sculptured by Donatello and Lucca della Robbia. Numerous paintings and drawings were purchased for circulation, and some additions have been made to the historical series of British oil and water-colour paintings. Amongst the gifts to the art library is a large collection of designs for wall-paper, by the late Mr. Owen Jones, presented by his sister. The decoration of the soffit of the arch of the lecture theatre by students of the training class, from Mr. Poynter's design, has been completed, and the refreshment rooms have also been decorated by students from designs by Messrs. Poynter and Gamble, and panels in the arch of the south court from Mr. Moody's designs. The total number of visitors was 913,701, a falling-off of 259,650 from the previous year, and attributable to the closing of the scientific apparatus exhibition. To the Bethnal-green Museum there were 670,214 visitors—the Indian presents belonging to the Prince of Wales being probably one of the chief attractions. During the year all the collections of the Royal Dublin Society, except the libraries, have been transferred to the Department, the land and buildings being vested in the Board of Works, Dublin. The committee state that they are anxious to commence the new science and art museum, but that the work has been stopped owing to the objections raised by Lord Pembroke and others to the use of the only available site in Dublin.

ARCHÆOLOGICAL.

British Barrows in North Wilts.—The Rev. Canon Greenwell, F.R.S., in conjunction with the Rev. Walter Money, F.S.A., of Newbury, has, during the past week, been exploring some of the many Celtic grave mounds in North Wiltshire. An examination was made of one of the largest of a group of four barrows placed on the point of a hill projecting towards the vale of Aldbourne. Three of these tumuli are connected with the surrounding ditch, and the fourth separate. Two stand upon what may be called platforms within the encircling ditch; in the other two cases the mounds rise from the inside of the ditch. The most northern has been opened by Canon Greenwell, and is 60ft. in diameter and 11ft. high, the width of the platform being 16ft., that of the ditch 12ft. A section of the barrow in the centre shows a layer over the surface, 3ft. deep, of pure chalk, the remainder of the barrow being principally earth, intermixed with chalk. Six feet from the top of the barrow was a stratum of small Sarsen stones, which extended over an area of 12ft. diameter. Those in the centre were much reddened by the action of fire, and had above and below them large masses of charcoal. At 9ft. below the surface, in the central portion of the mound, the burnt bones of a man of full age were met with. Immediately below that in a hollow 20in. in diameter, and sunk 2ft. into the chalk, were the burnt remains of a woman, with whose bones were found a small, perfectly plain vessel of pottery, of the type of the "Incense Cup;" a bone pin with perforated head, a thin flint flake, and seven beads of amber of varied size and shape, some discs, and others barrel shaped. In the barrow, indiscriminately placed, were numerous animal bones, numerous flakes and chippings of flint, and a singular manufactured article which seems to fall more into the class of knife than scraper.

Dale Abbey.—During the past week the excavations at Dale Abbey, Derbyshire, have been continued. The two chapels on the south side of the choir have been cleared, resulting in the finding of more of the vaulting ribs. In the extreme south chapel was found a vault 7ft. by 2ft., and 3ft. deep, but devoid of contents. One of the slabs with which it had been carefully covered in, was found, when overturned, to be a coffin-lid, ornamented with a cross fleury. The north transept walls have also been followed up, and it is proved that a chapel was built at the eastern side, communication to this addition being by a wide arch. At the eastern end, in front of the foundations of the high altar, a fine piece of the original pavement has been disinterred; it is of encaustic tiles, many of these being patterned with heraldic devices.

ARCHITECTURAL & ARCHÆOLOGICAL SOCIETIES.

The North Staffordshire Field Club and Archæological Society visited Derbyshire on Friday and Saturday last, under the leadership of Mr. Charles Lynam, of Stoke-on-Trent. Bakewell Church was the first place visited, Mr. Lynam exhibiting a plan showing the building as it appeared before the great alterations wrought in 1841. At that time the nave was of Early Norman work, and the transepts and tower piers Early English; all has been rebuilt, with the exception of the west wall and the western bay of nave. These fragments show an almost unique arcading of the nave, recalling a Roman basilica in treatment. The piers were mere rectangular pieces of wall, not shaped into columns, the imposts projecting only beneath the arch, and the arch being of the simplest semicircular form. The chancel is of Early English date, peculiar in the treatment of its external buttresses, and the springings of the internal arches of the windows; the flattened roof mars the original effect. Attention was called to the Foljambe monuments in the Vernon chapel, to the series of about sixty coffin-lids and coped stones found built up in the walls during the restorations of 1841, and now ranged in the south porch, to the rude crocketted font (ascribed to the 14th century), and to the cross in the churchyard. Mr. Lynam condemned the works now in progress of refacing the chancel external walls by cutting away the outer surface, and replacing with a separate face of stone. From Bakewell the members went to Haddon Hall, the chapel being specially noticed—the mode in which this consecrated portion of the buildings was rendered accessible from every part of the hall, yet kept external to it with an unobstructed eastern light, the Norman pier to south arcade, the altar slabs, with consecration cross still remaining, in south aisle and chancel, and the wall paintings and ancient stained glass, were all noticed. On the second day, Eyam was visited, the well-known cross in the churchyard being compared with that seen the previous day at Bakewell. In the church the Early English north arcade was admired, and reference was made to the simple character of the recent restoration. An early date has been assigned to the tower, but examination of its details lead to the conclusion that the date, 1691, on a stone over the west door records the time of its rebuilding. Having seen a fine and quaint 17th century house near by, the members proceeded to Tideswell Church, a noble transepted edifice of the Decorated period. The vestry is contrived by placing a screen wall across the chancel, near the east end, against which, on the west face, is the altar, and to the east the vestry; this arrangement is being copied at the present time at Brentwood Church. The vicar, the Rev. Mr. Andrew, explained the restoration in progress, including the removal of the cement with which the good external ashlar work had been encased. In the village Mr. Pennington's well-arranged museum was visited, and also the cavern and Blue John mine. The party returned to North Staffordshire by rail from Chapel-en-le-Frith station.

The Albert Club, in Eustace-street, Dublin, was opened on Monday. The contractors for the premises were Messrs. Dockrell, of George's-street, Dublin.

A vestry meeting was held at St. Ives, Hunts, on Tuesday week, to receive the reports of the architects—Messrs. W. Oldham Chambers, of Lowestoft, and A. W. Blomfield, of London—as to the condition of the spire of the parish church of All Saints. The reports were independent, and concurred in pronouncing the spire—an early 17th century addition to the tower—in a dangerously insecure state, cracks and fissures showing through the lower part of the masonry. This is attributed by both architects to the extreme thinness of the schemework, only 4in. from top to bottom, and bonding with iron cramps. Mr. Blomfield found out defects in the tower, and suggested that it might not be strong enough to bear a heavier spire. The spire is to be removed from the tower.

In the course of the demolition of houses on the south side of Ludgate-hill, now in progress, considerable remains have been discovered of a massive Roman wall, built of Kentish rag flints and chalk, with courses of thin tiles at intervals, and running in the direction of north-west by west from the foot of the hill.

At a recent meeting of the Town Council of Norwich it was decided to adopt the plans of the city engineer, a bridge over the river, and form a road from St. Martin-at-Oak-gates to Heigham. The abutments will be of Portland cement concrete, the bridge of iron, and 24ft. wide. The cost, owing to the gift of land for approaches, will be little more than £5,000.

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ILLUSTRATIONS.

SIR GILBERT SCOTT'S PREMIATED DESIGN FOR THE NEW RATHHAUS AT HAMBURG—THE NEW LODGE, BEDDINGTON-PARK — HOUSES IN LEWISHAM-PARK — MORNING CHAPEL, CHURCH OF THE ANNUNCIATION, CHISLEHURST—NEW ROMAN CATHOLIC CHURCHES AT TEMPLETUOHY AND RATHFARNHAM.

OUR LITHOGRAPHIC ILLUSTRATIONS.

MOURNING CHAPEL CHURCH OF THE ANNUNCIATION, CHISLEHURST.

Our illustration of the Mourning Chapel at Chislehurst is taken from the drawing exhibited this year at the Royal Academy. We have already illustrated the church itself—the interior on Dec. 25th, 1874, the exterior on Sept. 17th, 1875—and have now no further remarks to add.

HOUSES IN LEWISHAM PARK.

These houses have been lately erected on this estate, which is pleasantly situated near Ladywell Station (S.E.R.), Lewisham village, Kent. The houses are erected in stock bricks, with Bath stone dressings, and slated roofs; they are fitted with all modern conveniences, and have good cellars; a conservatory is placed off the first landing of staircase. The plans will speak for themselves. The four semi-detached houses have been well carried out by Mr. T. J. Jerrard, of Lewisham, Mr. Day being foreman of works; and the corner house by Messrs. Staines and Son, of Great Eastern-street. All are from the designs and under the superintendence of Mr. Horace T. Bonner, of Lewisham, and King-street, Cheapside.

THE NEW LODGE, BEDDINGTON PARK.

Beddington Park, the seat of the ancient family of Carews for many centuries, was sold under an Act of Parliament, and subsequently purchased by the Rev. Canon Bridges. Much has been done by him to improve the park, through which a beautiful trout stream, the Wandle, flows; new bridges have been built; keeper's house erected; the park enclosed; and various works besides the lodge shown in our illustration, which is taken from the drawing at the Royal Academy, and is built near the church, under the direction of Mr. Joseph Clarke, F.S.A.—Mr. Bridges' architect. The lodge is half-timbered, painted black, carried on a brick base with the plaster panels stamped and raised; the interior is carefully fitted up, and entirely in pitch-pine. Messrs. Roberts, of Rheidol-terrace, Islington, were the builders.

HOTEL DE VILLE, HAMBURG.

We have been favoured with permission to publish two perspective views illustrating the late Sir G. Gilbert Scott's designs for the Hotel de Ville at Hamburg, submitted in open competition in 1876, and exhibited this year at the Royal Academy. They derive some additional interest as the last large public building designed by Sir Gilbert, but, being unsuccessful, not exhibited or published during his lifetime. The views, of stupendous size, as well as the general drawings, were made in a little over a fortnight from elaborate sketches of Sir Gilbert's, designed whilst travelling on the Continent—he only deciding to compete about a month before the drawings had to be sent in. We may add that he successfully competed for the same building 27 years before. We give this week one of the views, and shall illustrate the alternative design in an early number.

TEMPLETUOHY CHURCH, CO. TIPPERARY.

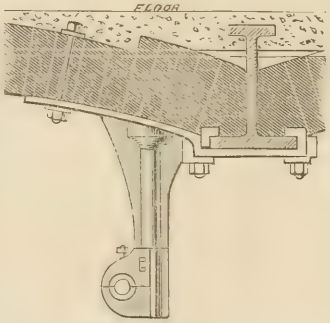
This building has been erected to replace the old parish church, which was ruinous. It is built of dark limestone, with light yellowish freestone dressings. The nave columns are of Aberdeen granite, the remainder of the internal stonework being of local freestone. The width across nave and aisles is 48ft., and the length 120ft. The works are being carried out by day's work, under Mr. Redmond as foreman. The cost will be about £4,000. The architect is Mr. G. E. Ashlin, Dublin.

NEW CATHOLIC CHURCH, RATHFARNHAM.

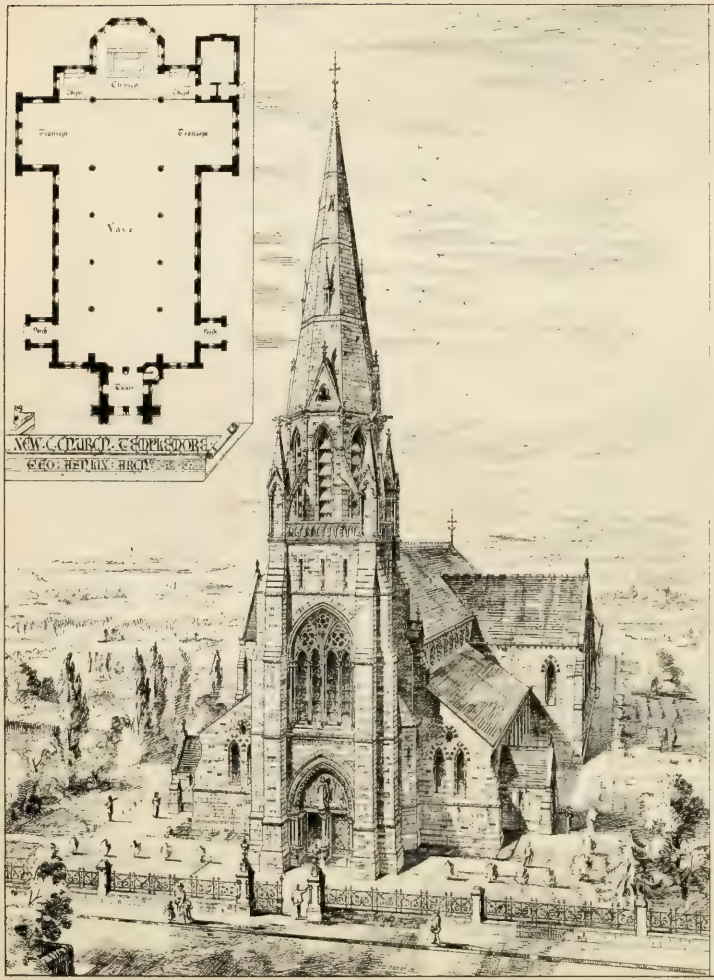
This building, which was opened a few months ago, is situated some miles from Dublin, and forms the parish church of a large country district. It is built of granite, with Portland stone dressings. The bell turret on the west gable is octagonal on plan, and rises to the height of 98ft. The principal internal dimensions are—nave, 92ft. by 21ft. 6in.; aisles, 90ft. by 10ft. 6in.; chancel, 25ft. by 21ft. 6in. The ceilings, except in the chancel, are boarded with pitch-pine. The nave ceiling is waggon-headed and panelled; the panels being enriched with stencilled decoration in two tints of stain colour. Red polished granite has been used for the columns of nave arcade, and for the detached shafts of chancel arch and nave responds. The nave caps are of Portland stone, moulded, those of responds having foliage carving and angles bearing emblems. The chancel is divided into five compartments externally by projecting piers springing from a weathering under the windows, and dying into the corbelled cornice, and internally by triple engaged shafts supporting the arched ribs of roof. It is lighted by coupled lancets in each compartment. The entire cost, including the altars and furniture, has been about £8,000. Messrs. Meade, of Dublin, were the contractors, and Mr. George E. Ashlin was the architect.

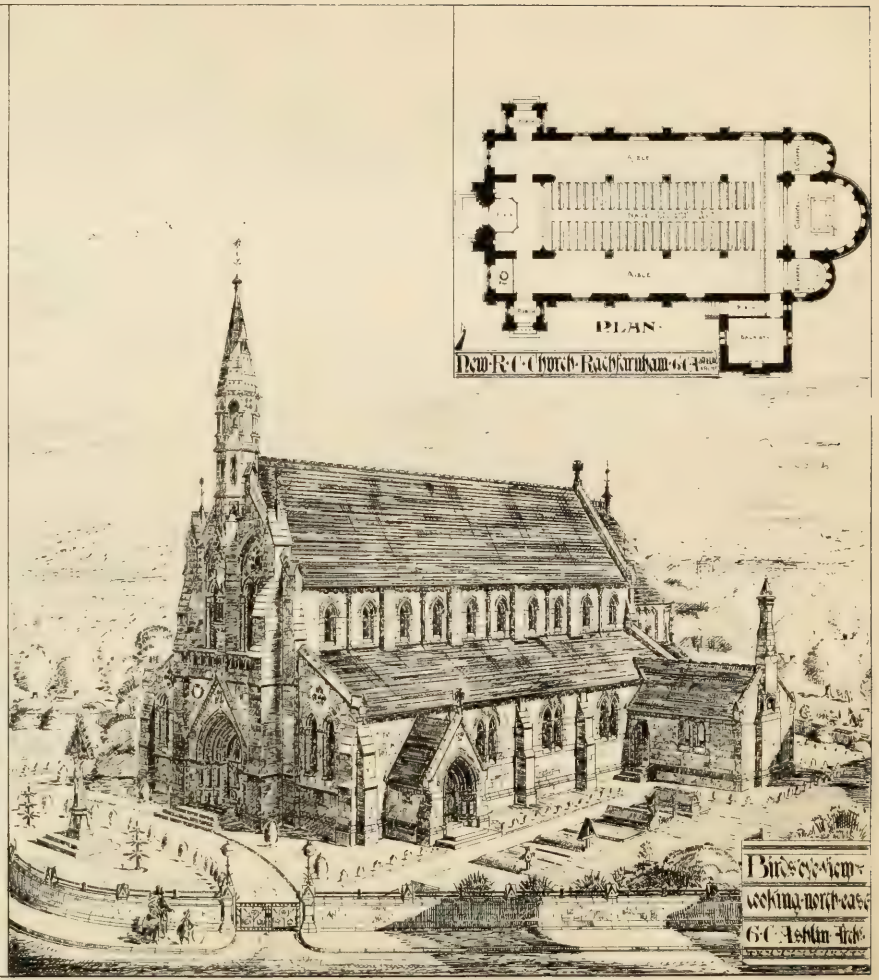
MILL AND FACTORY CONSTRUCTION.

In a previous article upon Sir William Fairbairn's excellent treatise on "Mills and Millwork" we alluded to the valuable suggestions he has given respecting the details of mills. Some architects eschew details of this sort, others despise them as inartistic matters unworthy of their attention, but those who



have mastered the mechanical part of their profession know the facility a knowledge of practical detail gives. In our first article we alluded to the modern system of transmitting power from a common centre to a number of machines placed at considerable distances, instead of having a separate water-wheel to every machine. Sometimes the lines of shafting extends to 200 or 300ft. in length, and at Saltaire the shafting, if placed in a line, would extend over two miles. It may be as well to say here that shafting is now usually of cast or wrought iron, and as the chief requirement in a shaft is to resist torsion cast iron is preferred on the score of cheapness and its high resistance to that stress. For the vertical shafts its rigidity is in its favour. The main point is the fixing of the horizontal and vertical shafts, and we propose here to give a few of the leading modes adopted in supporting them. Mr. Fairbairn enumerates three kinds of support: that on foundation stones in the floor; suspension from the ceiling; and from the walls. These kinds of support require as many forms of framework. Thus, when the support is from the floor a pedestal or kind of short standard is required. This usually consists of a cast-iron base-plate and column, with angle wings or webs at the base to strengthen and to stiffen it. The upper head is hollowed out to receive the brass steps and the cap or bush at the top, though the brass bush is omitted when the pressure of the shafting is downwards, and the cap is cast hollow and kept full of grease to lubricate the journal of the shaft. We may now pass on to notice the wall support, which is a more important detail in factory construction. In this case a similar kind of pedestal is employed, but instead of being placed on the floor vertically it is securely bolted to the wall, and projects horizontally. The same base-plate and column, stiffened by web pieces, are used; but a "shell cap" is substituted, and the base-plate must be bolted through the wall, top and bottom. Sometimes, when the pull is upwards, "lugs" are added to the extremity of the pedestal and cap for bolting the two together. Of course, in designing details of supports of this kind a consideration must be given of the kind of strain, the nature of the vibration, whether the pull is upward or downward, and the attachments should be arranged to best resist these forces. We have occasionally seen thick walls considerably shaken and dislocated from the violent wrenches and jerking action of the shafting, due to a want of attention to this action. The modes of suspending ranges of shafting from ceilings are equally important and various. If the "hanger," as it is technically termed, is attached to a wooden beam, a large bed-plate is bolted to the side of beam, from which is suspended the column or suspender with the usual caps fixed by a cotter. Another plan is to attach the "hanger" to the lower side of beam. In this case the bed-plate is, of course, screwed vertically through the beam. Sometimes a second line of shafting at right-angles to, and acted upon by, the principal line of shaft is provided for by bolting on to the hanger a small plummer block. We give a sketch of a hanger for supporting shafts from arched fireproof ceilings, recommended by the author. Where strength and stiffness are required, and the leverage of the hanger is long, it is very important to secure rigidity of fixing. It will be noticed, in this case, the hanger is bolted to a flange of the cast-iron beam, and by an extension of the plate to the curve of the arch, the hanger is bolted also to the latter, and thus all oscillatory movement is prevented. When two ranges of shafting meet at right angles at the corner of a room a cast-iron frame called a "wall-box" is inserted in the angle of walls, serving as a fixing for plummer blocks, which project therefrom and carry the shafts. The ironwork is bolted through both walls, and the box built in at the angle. The great weight of vertical shafts and the pressure upon the foundation is another fitting of some importance. The author shows an illustration of one. The horizontal or first-motion shaft is generally supported upon a plummer block, well bedded over a sufficient bearing area, and having a base-plate bolted through a brick base. The vertical shaft which gears into the former by a bevel-wheel is carried by a box above the first shaft, and contains the brass footstep for it to work upon. This box rests on a large base-plate bolted to the foundation stones, and laterally to the walls. We may add a few words about shaft connection. When machinery is placed at different angles from the line of shafting an universal joint is occasionally employed to transmit the power from the main line, and when the angle is obtuse this joint works well. The author, however, prefers bevel-wheels, as working with less trouble and greater ease. For long lines of shafting the coupling of short lengths is necessary, and this is managed variously by coupling boxes to slide over the two ends; half-lap couplings formed by lapping the ends of such shaft; disc coupling, by which the ends are bolted together by two flanges, one at the end of each; and circular half-lap coupling, the last of which was introduced by the author, and is preferred as more accurate and durable. By those who require to master these details Sir W. Fairbairn's last edition of "Mills and Millwork" will be read with interest and profit.





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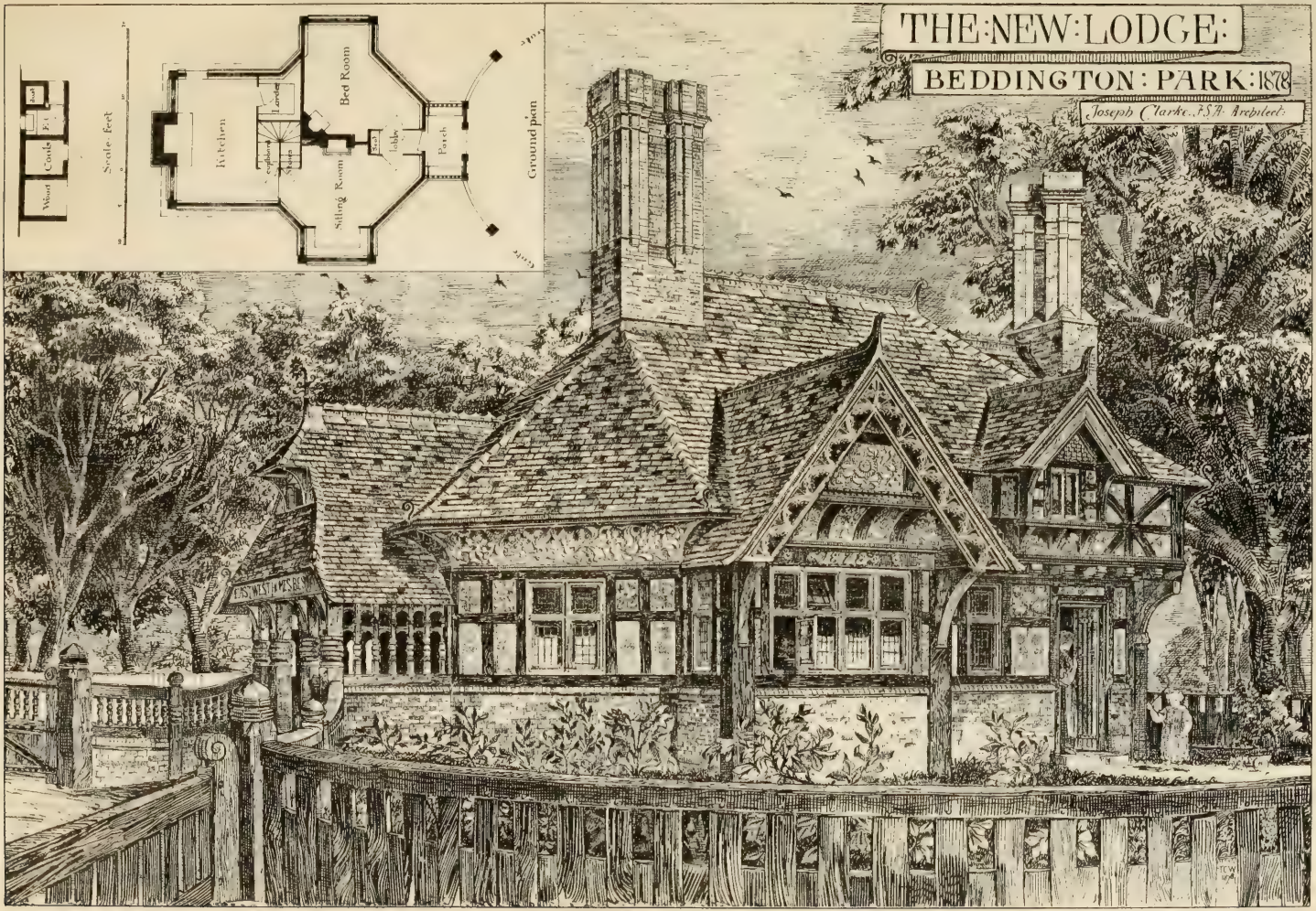
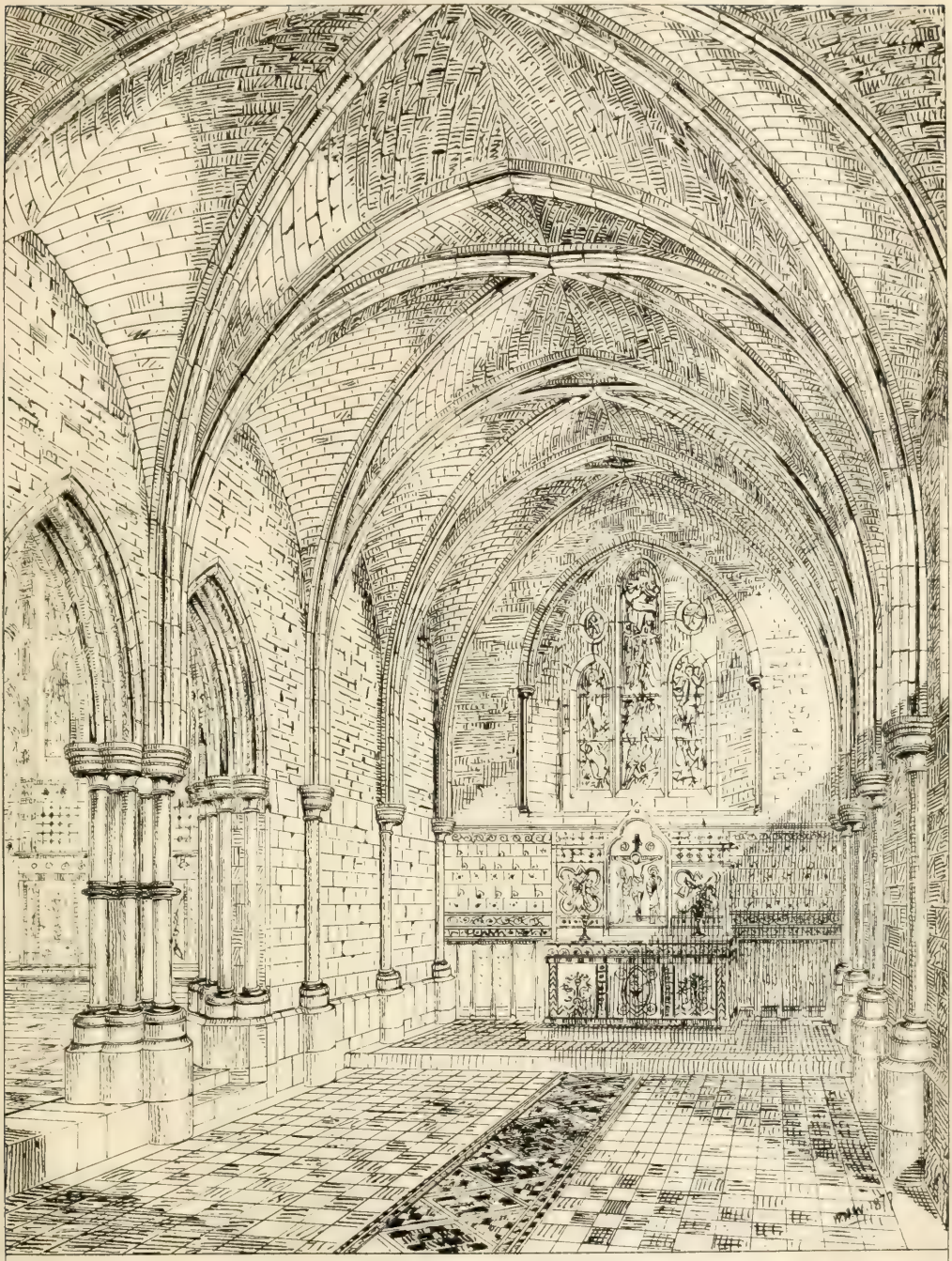

THE:NEW:LODGE:
BEDDINGTON: PARK: 1878
Joseph Clarke, F.S.A. Architect:
Ground plan
Scale Feet
Kitchen
Bed Room
Sitting Room
Porch
Coals
Wood
Pump
Cupboard
Sink
Table
Dresser
Table
Scale

12 Houses in Lewisham Park S.E. Horace T. Bonner. Arch.t
Ground Plan
Plans of the Corner House
First floor Plan
Second floor Plan
Erected AD 1877
Ground Floor
1st floor Plan
Plans of the Semi-detached Houses



Morning Chapel Ch. of The Annunciation Chisleburst. James Brooks Arch. 1877.

COMPETITIONS.

Battersea Vestry Hall.—At a meeting of the vestry of Battersea, held on Thursday night, the 26th ult., resolutions were passed declaring it desirable that a vestry hall be built for the use of the parish in place of the Lammas Hall, that for that purpose the provisions of the Act 13 and 14 Vict., cap. 57, be put in force, and further deciding that in the event of the consent of the Local Government Board being obtained, a committee be authorised to advertise for plans and estimates, and to report back to the vestry thereon.

Spalding.—Twelve architects have entered into a competition for central board schools, proposed to be erected by the Spalding School Board.

Tiverton.—We understand that no less than 130 applications have been made by architects for the necessary particulars to enable them to compete for the plans for the erection of the new Blundell's School buildings at Horsdon.

Yeadon.—The building committee for the Yeadon Town Hall and Mechanics' Institute having considered the numerous plans sent in to them in answer to their advertisement, and having also obtained the advice of a professional man to aid their deliberations, decided to adopt the plans marked "H" for the first prize, "*Aide toi et le ciel t'aidera*" for the second, and placed those marked "Cambridge B" third. On opening the envelopes containing the names of the competitors it was found that those plans belonged respectively to Mr. W. Hill, of Park-square, Leeds; Mr. W. H. Thorp, of St. Andrew's-chambers, Park-row, Leeds; and Messrs. T. and F. Healey, of Tyrrel-street, Bradford.

Messrs. G. A. Williams and Son, of 21, Queen's-road, Bayswater, have been awarded honourable mention at the Paris Exhibition for their well-known specialities in window blinds.

The building of new Board Schools at Felstead and Rayne, Essex, was commenced last week. Mr. Pertwee, of Chelmsford, is the architect, and Messrs. Parmenter and Gossett are the respective contractors.

The new Wesleyan memorial chapel, at Oxford, erected from the designs of Mr. Charles Bell, and illustrated by us, Feb. 18, 1876, is to be opened on the 11th inst. Messrs. Symon and Co. have carried out the contract for erection.

The Collegiate Church of St. Ignatius, Galway has had its chancel highly decorated. The building is Gothic in character, and the woodwork of the roof has been stained and relieved by cobalt, blue and cream-coloured decoration. A marble altar and oak pulpit have been erected. The latter is octagonal in plan, and of oak, and is the work of Mr. Harry Hems, of Exeter. The whole of the additions have been designed by Mr. William Hague, architect, 44, Westland-row, Dublin.

Major Hector Tulloch, R.E., held an inquiry at Ventnor, I.W., last week, on behalf of the Local Government Board, touching an application from the Ventnor Local Board, for sanction to borrow £4,171 for the following purposes:—High-street improvements, £200 and £60; footpath at Cottage Hospital, £58, and at St. Boniface-meadow, £214; completing esplanade, £1,537, and diverting outfall-sewer to Collin's-point, £302. At the close of the inquiry the inspector urged the board to proceed with the sea-wall and esplanade as soon as possible, and promised to expedite the getting of sanction for the pressing expenditure on groynes as much as he could.

Sadler's Wells Theatre is about to be remodelled and rebuilt for Mrs. Bateman, from the designs of Mr. C. J. Phipps, F.S.A.

A new Wesleyan chapel is about to be opened at St. Andrew's, in the island of Guernsey. The front is marked by four Ionic columns, but the windows are lancet-shaped. It is pewed for 302, and cost £1,400.

The new synagogue of the Hand-in-Hand Asylum, in Well-street, Hackney, was consecrated on Sunday. The cost of site and building has been £2,400.

New Board Schools at East Twerton, near Bath, were opened on Monday week. They are in three departments, and accommodate 419 scholars. Messrs. Gill and Browne were the architects, and Mr. Bladwell was the contractor. The fittings were supplied by Messrs. Woodward Brothers, of Bristol. The total cost of buildings, tar-paving, and boundary walls and fittings has been £3,500—equal to £8 6s. 8d. per head.

A stained window, by Messrs. Burlison and Gryls, of Newman-street, W., is about to be placed in Plympton St. Mary's Church.

Building Intelligence.

Belper.—Christ Church, which was built in 1850, was re-opened on Sunday after restoration and decoration. The roof timbers have been freed from varnish, and ornamented from designs partly adapted from the Savoy chapel, by Mr. Corbauld, well carried out by Mr. T. R. Hibbert, of Belper. The ceiling between the timbers of the chancel has been coloured in pale blue and gold. The upper portion of the wall surface has also been decorated with stencil patterns on a buff ground, the dado being painted a chocolate colour. The east window and three of those in the aisles have been filled with painted glass, representing foliage, by Mayer and Co. The floor has been lowered in the nave by 5in., and new seats of pitch pine set upon it. The passages have been paved with encaustic tiles, and the choir and sacrarium by others of more elaborate design.

Handsworth.—The parish church of Handsworth has been restored under the direction of Mr. J. A. Chatwin, of Birmingham. The chancel has been slightly lengthened, and the nave at the west end considerably so. The roof has been heightened, the ungainly north transept has been remodelled, and an extra aisle gained on the north side, while the tower has been opened to the church, and the effects of intramural interment overcome by layers of concrete. All this is a gain in regard to the increased accommodation, which now provides 1,000 sittings. The old solid font, which has been lost sight of for so many years, has been discovered in a near farmyard, where it did duty as a drinking trough for cattle. This has now been properly overhauled, and set in position near the main entrance. The want of clerestory windows is mainly responsible for the inadequate lighting of the building; while the disproportionate width of the building, with its two northern aisles, still further increases this difficulty. Externally the work of attempting to reconcile styles dating from the Norman to the Georgian, has not been unattended with success. The builders are Messrs. Wilson and Son; the clerk of the works is Mr. James Jones. The carving of the stone is by Mr. Roddis; the altar tiles are from Maw and Co.

Metropolitan Board of Works.—At the first meeting of this board after the recess, held on Friday, it was referred to the works committee to consider and report as to the correctness of the statements made that the water of the Thames where the Princess Alice disaster took place was "poisonous," and "its taste and smell something it was impossible to describe," and whether such state of the water, if correctly described, arose from the main drainage outfalls. It was also proposed that the same committee should consider and report "whether the sewage discharged into the river at the board's outfalls could not at a moderate cost be so purified before its discharge as to render it innocuous and inoffensive, as well as free from solid matter." This gave rise to a long discussion, many members deprecating the form of the resolution as admitting the charges raised against the board's sewerage scheme, and the motion was lost, the votes being—for, 7; against, 19. Designs submitted by Mr. J. Woolfe Barry for a bridge to carry the Fulham Extension line of the Metropolitan District Railway over Parson's Green-lane, were approved. The solicitor presented copies of the following public and private measures affecting the board passed in the last session of Parliament:—Metropolis Management and Building Acts Amendment, Metropolis (Bowman's-buildings, Marylebone, &c.) Improvement, Metropolitan Board of Works (Money), Monuments (Metropolis), Plumstead Common, Contagious Diseases (Animals), Epping Forest, Expiring Laws Continuance, Highways and Locomotives (Amendment), Metropolitan Commons Telegraph, Grand Junction Water, London and North-Western Railway (Additional Powers), London, Brighton, and South Coast Railway, Metropolitan District Railway, Metropolitan Inner Circle Completion Railway, and Midland Railway (Additional Powers) Acts.

Nottingham.—On Friday a committee of the Corporation visited the new University buildings, in Horse Fair Close, to inspect the progress of the work, and were accompanied by the architect, Mr. Richard Mawson (of the firm of Lockwood and Mawson). We described the designs, which are Decorated Gothic in character, on November 10th, 1876, p. 461, Vol. XXXI. The main building is divided into three principal sections, with the library forming one wing, the museum the other, and between these chemical and physical laboratories and lecture theatres, and a large general or public theatre. This central block is separated from the wings by a quadrangle on either side; it is now nearly roofed in, and almost ready for slating. The library and museum blocks are almost as forward, and the large gables on the Shakespeare-street front have been commenced. The whole of the contracts are in the hands of Mr. T. White, of Swansea, who is making full use of machinery with the aim of expediting the work. The carving, which is in the hands of Messrs. Farmer and Brindley, of Westminster-bridge-road, is in course of execution, and that already completed displays much delicacy of workmanship. Each of the capitals is specially designed. The ironwork is being supplied by Messrs. Richardson, Ellson, and Co., of Coventry. It was stated to the committee that Mr. White hoped to have the buildings completed within 12 months from the present time, and about a year earlier than the limit laid down in the building contract.

Overton.—The parish church of Overton, Wilts, has been restored, and was re-opened upon the 25th September. The nave has been reconstructed upon the old foundation, but extended by adding one bay, and by the addition of a new north aisle. The chancel and its aisles and the vestry stand upon new lines. The style adopted for the new work is Early Geometrical. The materials used in the walling are flint and Sarson stone, and the dressings are of Bath. The total number of sittings are 320. The floors of the chancel are laid with encaustic tiles by Messrs. Minton, Pollins, and Co., of Stoke-upon-Trent, who also executed the reredos, and the edifice is heated by Mr. Haden, of Trowbridge. The gas-fittings are by Messrs. Jones and Willis, of London, and this firm supplied the altar cloth and font-cover. The tiled floors in the nave and baptistery are by Mr. Godwin, of Hereford. The choir seats, stalls, and other oak work, are by Mr. Harry Hems, of Exeter. The works have been carried out from the designs of Mr. Charles E. Ponting, of Marlborough. Nearly £7,000 have been expended.

Sheffield.—The Sale Memorial Church, Sheffield, was consecrated on Monday. The church has been erected at a cost of upwards of £9,000. It consists of a nave, aisles, and chancel, the latter having an octagonal end, and transepts to the chancel, one being used for a vestry and organ, and the other for school children. There is a large porch extending across the end of the building, out of which the church is approached by three doorways. There is also another porch at the opposite end. The style is plain Early Pointed, with geometrical tracery in the chancel. The internal length is 190ft., and the width 65ft., the height at the centre being 51ft. The nave has a clerestory. The chancel has no clerestory, but the walls are the same height as the nave, and have two large arches opening into the transepts. The seats accommodate about 800. The architects were Messrs. Flockton and Gibbs, and the contractors Messrs. Battersby, Oxley, Corrie, and Harrison.

Slough.—The parish church of Slough has been considerably improved under the direction of Mr. J. O. Scott. The old church has not been altogether removed, but it now only performs the part of a temporary nave. The new part already erected consists of one bay of the new nave and its aisles, north and south transepts, a very fine chancel, and north and south aisles, north and south porches, an organ chamber, and vestries. The style of architecture adopted is the transition between Early English and Decorated. The principal dimensions are as follows:—Width of nave 25ft.; width across nave and aisles 57ft.; height of nave walls to springing of roof 37ft.; height of nave ceiling 53ft.; height of cross on nave gable 61ft. Extreme length of transepts, north

and south, 80ft., and width of transepts 20ft. The length of the chancel is about 40ft., and the width about 22ft. The height to the springing of the chancel arch is 23ft., and it rises to a height of 38ft. When complete, the nave will be 105ft. in length, and will have arcades of four arches on each side, exclusive of those which connect the transepts with the nave. There will be a south porch, and on the north side an entrance will be effected through the tower. The east ends of the nave aisles are divided from the transepts by an interesting and rather unusual arrangement, which may be described as a short arcade, in each case of two arches. The principal material for the walls is red brick of two kinds, the lighter kind used for ordinary walling, and the dark shade being used for bands, &c., in very thin bricks, and these are adopted both internally and externally. All the principal features and dressings are of stone, which consists chiefly of selections from the various Bath stone quarries. The most characteristic feature internally is the great rood-screen of elaborately wrought and carved stone. This consists of three arches supported on pillars of Greek green marble, and surmounted by a large cross. The pavement of encaustic tiles has been executed by Messrs. Minton and Co. The church is heated by warm air by the London Warming and Ventilating Company. The total cost of the building up to the present time has been about £11,000. The superstructure has been carried out by Messrs. Fassnidge and Son, of Uxbridge.

Studley.—A new church at Studley, the gift of the Marchioness of Ripon, was consecrated on Monday week. The building is Early English in style, and is from the designs of Mr. W. Burges, of London; it consists of nave with aisles, chancel, chapel, vestry, and a western tower surmounted by spire rising to a height of 152ft. The mouldings and carvings are very ornate. At the east end of the south aisle is a chapel dedicated to St. George, and here a family vault has been prepared for the de Grey and Ripon family. The total sitting accommodation of the church is for 400. The west window contains eight scenes from the life of the Virgin, the figure of the Holy Family occupying a central position in the upper tracery. The subjects of the aisle windows are all Scriptural; those in the chancel are taken from the book of Revelations alone. The clerestory windows depict the angelic hierarchy. This portion of the work has been executed by Messrs. Saunders and Co., of London, the cartoons having been prepared by Mr. F. Weeks. The builder was Mr. J. Thompson, of Peterborough, the clerk of works, Mr. J. Thomas, of Cardiff, and the sculptor, Mr. T. Nichols.

Warley, West Riding.—The new Church of St. John, Warley, will be consecrated tomorrow by the Bishop of Ripon. The plan shows a nave 60ft. × 21ft., south aisle 46ft. × 11ft. 9in., chancel 29ft. 3in. × 19ft. 6in., organ chamber to chancel 26ft. × 11ft. 9in., and vestry and heating chamber. At the west end of north aisle is a tower of three stages, finished with parapet and pinnacles. The style is Early English, but there is an entire absence of ornament, the chief doorway being the only instance externally where mouldings are introduced. The walls are lined with ashlar masonry. The open benches in nave and aisle are of pine, and seat 325 persons. The pulpit and font are of local stone, and the lectern and altar rails of brass. Carvers' work is restricted to the bosses at the termination of the hood moulds over the arcade and the caps and brackets to the chancel arch. Mr. W. Swinden Barber, of Halifax, is the architect.

Wribbenhall.—The foundation stone of a new church for the parish of Wribbenhall, situated between Kidderminster and Bewdley, was laid on Saturday. The church will cost nearly £6,000, and accommodate 460 worshippers. At present it will consist of a nave, south aisle, and chancel, and on the north side of the chancel will be a bell turret, surmounted by a small spire, and on the south an aisle containing the vestry and a few sittings. The building is being constructed of red Alveley stone externally, and internally Bath stone is being used except for the shafts of the columns, which will be of Alveley stone. The architect is Mr. A. W. Blomfield, of London, and the contractors are Messrs. Horseman and Co., of Wolverhampton.

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TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.]

All letters should be addressed to the EDITOR, 31, TAVISTOCK-STREET, COVENT-GARDEN, W.C.

To Our Readers.—We shall feel obliged to any of our readers who will favour us with brief notes of works contemplated or in progress in the provinces.

Cheques and Post-office Orders to be made payable to J. Passmore Edwards.

ADVERTISEMENT CHARGES.

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Advertisements for the current week must reach the office not later than 5 p.m. on Thursday.

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Enquirer.—(What do you mean by "follies?" A more definite query may appear if sent.)

"Building News" Designing Club.—C. Palmer, Norwich. (The scale is to be one-sixth of an inch to the foot. By brick we mean that the windows are to have arches of that material.)—Geo. Scarge French. (The rules published explain all the matters you ask about. There are no fees, and the drawings are returned.)—R. Kendrick. (All drawings to be on one sheet.)—H. G. Williams. (The conditions of membership are distinctly stated in the rules published, and the foregoing replies will answer your queries.)

Our Commonplace Column.—Through pressure on our space we are unable to publish our column this week. Notes and quotations upon the following will be received on or before the 22nd day of October:—Diminution of Column, Domus Conversorum, Dove-house, Early English, Earth-closet, Easter, Eaves, Ebony, Elizabethan architecture, Elm, Embankment, Encaustic tiles, Entresol, Entasis, Exchange, and other subjects in letter E.

Correspondence.

SPECULATIVE HOUSES.—WHAT IS AN ARCHITECT?

To the Editor of the Building News.

Sir,—"No Humbug" strikes out right and left, intending, evidently, to hit somebody very hard indeed, but however well-meaning his zeal, he appears to waste his blows. Most people will grant that it is very trying to a professional man, especially in a country town, to see perhaps some local auctioneer or decayed builder styling himself architect, and "tumbling into a lucrative practice." But you cannot blame the would-be architect; it is the public to whom the blame is due for not knowing a real architect from a sham. But then comes the question, "Are the public so blind after all?" It may be true that enterprise and cheek will do a vast deal for a man, but it is very far from reasonable to argue that the "plodding clever man of reticent habits" is the best man for the wants of the public. If a man cannot look after himself he surely must not blame the world for not taking care of him. An architect who does not keep his eyes and ears open may rest assured that the enemy, in the shape of "Mr. Would-be," of whom "No Humbug" complains, will step in and carry away the prize. Again, it is not always the reticent man who has a right to be known as possessing real ability. Usually I think men who bewail themselves in this way are the greatest duffers under the sun, simply because if a man has anything in him at all his light is sure to shine before men, be it only in his own back yard, so to speak. No one deplores more than I do the want of a juster taste in architectural matters on the part of the public, but I am bound to confess that those architects, or surveyors if you will, who have the largest practice, for the most part give the public the best buildings procurable, all things considered, from a public point of view. This is a long way to go, but believe me there is "no humbug" about it. These successful architects are not merely artists—they are pre-eminently men of the world, with a very sharp eye indeed to the main chance—well knowing how to look after their own wants, and therefore, in the eyes of the public, the very men to employ to look after theirs. Here is an instance—a fact, I assure you—which occurred some years ago now, in the days of "brazen faces and shiners" (they are not extinct yet), when one of the largest connections which the architectural world has ever seen was being formed. The rising practitioner, now known as a leading art architect and champion of the "very Gothic" school, was visiting a well-known watering place in the south of England on business, and staying, of course, at the best hotel in the place (cute fellow). Being anxious to improve the occasion he called the waiter, and inquired as to the leading builders in the town, and thus ascertained the name of the best known contractor in the place. Handing his card to the waiter he commissioned him to carry it with compliments to Mr. So-and-so, with the invitation to come over and take a glass of wine, with our not unknown and rising architect, after dinner. The builder came, all smiles and graces (builders are cute men, too, especially the successful ones), and in reply to kind inquiries from the stranger as to what was doing, said a church was about to be erected from designs by Mr. Heathen, of London, the architect to the Such-and-such Society. "Ah! I know him well," was the reply; "a friend of mine. Take another glass, Mr. So-and-so." "Lady Blank is to bear the expense," added the builder, in response to this generosity. Next day Lady Blank received a visitor with some sketches under his arm, which, after some pressing manœuvres, he managed to lay before her ladyship, resulting in some specially prepared perspectives being sent down from London in a few days, and not long after the erection of a church, not from the designs of Mr. Heathen, which had long ago been prepared—let us hope were paid for. No doubt they were, for he was the friend of the architect who built the church, and whose name now is enriched with several fragments from the alphabet. Shame!—of course a thousand times shame!—but we won't mention names, only let individual members of the profession see that they do not do likewise. Do your duty to yourself and others, and there will be but small cause to complain of the Mr. Would-be on the one hand, or Mr. Highartallgrasp on the other.—I am, &c., Neither.

OAK AND CHESNUT TIMBER.

Sir,—I had hoped that this question, to which you were good enough to devote some space and an illustration, was pretty well thrashed out; but the writer of the paper, "A Chapter on Some Kinds of Timber," in last week's Building News, p. 315, has referred to it in a manner which can only mislead. A careful reader, with some previous knowledge of the subject, will easily detect that the upper woodcut is wrongly lettered, and that the titles of the respective parts of it are transposed; but the writer evidently misunderstands the method of distinguishing oak from chesnut which I described, unless I ought to say that he

discredits it, and yet has not tested it by experiment.

The tests I gave, and which I submit are perfectly conclusive whenever they are applied with the view of establishing an obvious distinction between oak and chesnut, are these:—

1. Cut the log across, and, if it be oak, the medullary rays, which in that wood form thin plates, will be seen to be cut across, and will form bright conspicuous lines radiating towards the circumference.

2. Divide the log longitudinally, cutting through the pith or pretty near to it; then the medullary plates, being slightly wavy, will be frequently split up, showing the bright conspicuous markings called the flower or silver grain—see A B C D in last week's paper.

It is quite true that there is no such obvious distinction if the circular face of the log be merely cleaned, or the log reduced to a square section; but why should any one perversely apply as a test that which is no test when two infallible tests are at hand?—leaving out of account the tests of weight, hardness, and colour, which are quite sufficient for the guidance of a practical man.

I am glad of this opportunity to say that, having recently been at Metz, I inquired about the roof of the cathedral there, which was burnt a few years since, and much lamented, as a "chesnut roof." Not an atom of it was left, but the custodian assured me that the chesnut trees had been grown on the hill of St. Quinten near the town—a great bare hill, probably never wooded. He showed me two ancient doors in the building as being of chesnut—one only could be closely examined, and that contained the silver grain of oak.—I am, &c.,

Thos. Blashill.

CONWAY CHURCH.

Sir,—Will you allow me to thank Mr. Mackenzie Walcott for kindly bringing Conway Church before the notice of the readers of the Building News, and also to make known to them that it is now proposed to proceed with the restoration of the chancel under the superintendence of Mr. John O. Scott, who has been engaged in the restoration of the roofs and nave. Over £2,000 has been already spent on these works, almost the whole of which sum was obtained from those who were connected with the parish in some way or other. During the last two years I have not been able to obtain more than £100 towards the restoration of the chancel, a portion of the church which is full of interest. It is estimated that about £500 will be required to restore this and the fine old screen; and it is needless to say that the work will be carried out in the most rigorously conservative manner by Mr. Scott. If there be any among your numerous readers who would like to help in the good work, I shall be glad to receive any contributions, a full list of which will be published, as hitherto. I will merely add the following extract from Mr. Scott's last report, with many thanks for kindly inserting this letter:—"The main feature of Conway Church, and that which raises it in rank above many more architectural edifices, is the beautiful rood-screen. It is of the highest value, and demands the most careful treatment. The stalls are also very fine; they have, unfortunately, been considerably injured by fire. It is to be hoped that before long they may be put into a proper state of repair."—I am, &c.,

Henry Rees.

The Vicarage, Conway, 24th Sept., 1878.

RESTORING THE PALACE OF WESTMINSTER.

Sir,—I have read your article in the Building News of the 27th ult., on the state of the stone in the Palace of Westminster with great interest, but not altogether with satisfaction. The state of this costly building must be a subject of interest to everybody who cares about national questions, and I think you have done well to direct attention to it. But I merely wish to make a few remarks on your conclusions as to building stones which you infer or consider to be more or less durable. Although I am the lessee of the Doulting freestone quarries, and occupy Ham stone quarries, I do not wish to puff my own wares, depreciate other kinds of stone, or to make any invidious comparisons, yet I hope I may be excused for calling attention to the fact that the Doulting freestone answers precisely to the description quoted by you as that required for the best building stone—viz., it is a "crystalline limestone, is uniform in tint, homogeneous in structure, and is converted to building purposes with facility and economy." There can be no doubt but these characteristics are the most valuable in a building stone. The present state of the Doulting stone in Wells Cathedral and the ruins of Glastonbury Abbey shows its extraordinary durability. Although part of the latter dates from the twelfth century, the stone shows no signs of decay. In new work it always hardens by exposure, and in a little time it acquires the glazed surface and glassy appearance which are the only preservatives against the injurious effects of the atmosphere.—I am, &c.,

Charles Trask.

Norton-sub-Hambdon, Ilminster, Oct. 3, 1878.

THE LEEK FEVER HOSPITAL.

Sir,—Will you insert the following copy of letter to the Leek Commissioners?—I am, &c.,

W. Larner Sugden.

[*Copy.*]

TO THE CLERK TO THE LEEK IMPROVEMENT COMMISSIONERS.

Sir,—We are in receipt of your communication returning our designs submitted in competition for your fever hospital.

As your board has not fulfilled the conditions it issued for this competition, we hold it responsible to us in the amount of the usual professional charges for the preparation of the plans and specifications.

We refer to clause 8 of the conditions, which promised reference of the designs to the Local Government Board. It was this condition which led us to enter the competition, which we should never have done had we supposed that the board or its surveyor were to decide the matter; and our designs have been withheld altogether from the Local Government Board's inspection.—Yours truly,

W. Larner Sugden, Leek.
John Blood, Newcastle-under-Lyme.

Leek, October 1st, 1878.

DR. HOLLAND AND HIS PENSION.

Sir,—My attention has been directed to your notice (on p. 306 of the issue of the 20th ult.) of an article in the *Preston Chronicle* on the above question, in which it is stated that one of the reasons for granting the pension to Dr. Holland was, that *he had designed the asylums at Prestwich and Whittingham, and thus saved the county the expense of employing a regular architect.* I know nothing about the Whittingham Asylum, but so far as Prestwich is concerned the statement is wholly incorrect. In June, 1847, designs for the Prestwich Lunatic Asylum were submitted by myself and brother in competition, which designs, with certain modifications, were selected, approved by the Commissioners in Lunacy, and the buildings carried out to completion under our own superintendence. S. Gaskell, Esq., M.D., of the County Asylum at Lancaster, was during the whole of the time in communication with us, and advised on all the details. As Dr. Holland was not appointed until October, 1849, at which time the buildings were nearly completed—they being occupied early in 1851—and as our connection with the building did not cease until 1852, you will see that the statement above referred to is simply untrue.—I am, &c.,

Isaac Holden,
(of the firm of I. and J. C. Holden.)

64, Cross-street, Manchester, Oct. 2.

A new line of tramway from the corner of Holloway-road to King's-cross (*viâ* Caledonian-road) has been opened by the London Street Tramways Company.

The parish church of Grosmont, Monmouthshire, was reopened on Thursday week, after the restoration of the north and south transepts, from the plans of Messrs. James, Seward, and Thomas, of Cardiff, who have also prepared designs for the restoration of the nave and its aisles and the west front. The central tower (which was then threatening to collapse), the chancel, and its Eleanor chapel were restored a few years since, under the superintendence of Mr. J. P. Seddon, of Westminster.

The new Church of St. Mary, Gayhirne-cum-Ringsend, near Wisbech, was consecrated on Tuesday week. It is Early English, and has been built from the designs of the late Sir Gilbert Scott, at a cost of £4,000.

At Whitby, Sir George Elliott, M.P., is having erected at his sole expense a spa saloon on the West Cliff. Messrs. Julius Mayben, of London, and E. H. Smales, of Whitby, are the architects, and Mr. John White, of Whitby, is the contractor. The building is nearly completed.

Intercommunication.

QUESTIONS.

[5530.]—**Ownership of Fence.**—I am desirous of ascertaining the ownership of a wooden fence dividing two gardens. I have been told that the fence belongs to the house upon which the posts are placed, the upright pales being fair with the adjoining ground. If such is the case, how could the palings be renewed if the adjoining owner refused permission to go on his ground to do the work? I understand there is some law on the subject, but cannot trace it. Will some correspondent kindly say what is the general rule?—H. W. B.

[5531.]—**London Churches.**—I shall feel obliged by some correspondent mentioning what London churches of a Classic type have been recently decorated in such a manner as to be worthy of visiting with a view to getting hints?—Provincial.

[5532.]—**Dilapidations.**—Will some correspondent kindly inform me whether there is any particular system of charges for "dilapidations?" If so, please state if it includes any work beyond taking the necessary notes for and preparing the schedule?—J. H.

[5533.]—**Party Wall.**—M and N are adjoining owners, their buildings separated by a 14in. party wall. M intends to rebuild, and the condition of the party wall necessitates its being pulled down. The height of M's new building is such that the new party wall, in order to comply with the Buildings Act, must be 18in. thick instead of 14in.—the thickness of the old wall—which would be the full thickness required by N's building. Under these circumstances, what should be the position of the centre line of the new wall with respect to the two properties? Should it be in the same position as the centre line of old wall, thus by the extra thickness of new wall reducing the space of N's rooms; or should the space of N's rooms be left unaltered, thus necessitating the removal of the centre line of new wall 2½in. further towards M's ground than was the case before rebuilding, and thus giving to N an increased width of ground by 2½in.?—J. H.

[5534.]—**Labourers' Dwellings.**—Will some of your readers be good enough to mention the names and localities of cottages for the labouring classes where rent not exceeding 4s. a week is charged; and does such sum pay a fair interest on the capital?—Contemplator.

[5535.]—**Press.**—Can any of our friends give me a working design for a strong press about 30in. deep by 10in. or 12in. in diameter? Material must be such that weak acetic acid will not affect it; and I may add that the liquor is wanted, and not the dry material. I wish to make it myself, having all necessary tools, as I cannot afford to give the heavy prices charged by manufacturers for such articles. A few plain directions respecting strength of screw, size of threads, thickness of bridge, and kind of metal to be used, will be thankfully received by—A Poor Mechanic.

[5536.]—**Timber for Sills of Sash Frames.**—Which is the most suitable timber for sills of sash frames—red deal or pitch pine? Also, is it necessary to run lime for plasterers 4 months before using it?—A Subscriber.

[5537.]—**Architects and Corporations.**—I shall be obliged to any of your readers who will enlighten me as to the following matter:—If an architect supplies plans for the erection of new buildings to a corporation for their approval, is he bound (in the event of the same being approved) to supply duplicate copies of the plans for the use of the corporation, or is it the duty of the borough surveyor? I have asked for a copy of the bye-laws, but cannot get them.—A. B.

[5538.]—**Land Drainage.**—Would any reader kindly inform me if there is any special method in finding the quantity of pipes to drain an acre—how many are required, and the usual distance apart on average land?—Inexperienced Land Agent.

[5539.]—**Law as to Disputed Contract.**—A gentleman employs a builder to erect a house for him for a certain sum. The builder signs a contract, but does not sign the specification or contract drawings, and now argues that the stamped contract is an informal contract, and is not binding. The house having been finished, the builder wants a considerable sum, as he has lost money, having tendered too low. The employer in the first instance employed an architect to prepare drawings, specification, contract, and to obtain tenders from builders—the lowest tender exceeding by £300 the sum he proposed spending. For this he got rid of his architect. He then gave the job to the builder referred to, and told him he was to do it at his own price, as there would be no architect to look after him. The builder thereupon reduces his estimate by £200, and builds the house, and now repudiates the contract, and threatens legal proceedings, for the above reasons. Will some reader give me instances of any legal cases bearing upon the above, and in what journal the cases are reported?—Surveyor.

REPLIES.

[5461.]—**Stamped Agreements.**—"A Lover of Justice" has fairly put the case that for one agreement there should not be more than *one* stamp, and when documents or drawings are identified by references in the manner I stated, and which I have adopted for many years, in common with many other architects, I cannot see why more than one stamp is required. The idea of sending, say, a set of 20 drawings to Somerset House is indeed too absurd to require consideration, as it would, as this correspondent says, "choke all business."—G. H. G.

[5508.]—**Chimney Flues.**—9in. square flues are large enough for all ordinary household purposes, and 14in. flues are not now a necessity, since climbing-boys as chimney sweeps have been abolished. In adopting small flues consideration should be given to the character of the grate—whether open or close in character, or whether ventilators or copper flues are inserted in the same—but the main consideration is the size of the pot or capping of the chimney. Experience has taught those connected with chimneys that the outlets at the top should be larger than any other part. An outlet of 9in. square would be considered a very full size, and there is no real necessity for having any other or lower part larger. The writer has seen small flues work exceedingly well in large and important buildings; but they have been smooth and regular—an advantage which is obtained by lining the same with flue pipes.—W. S.

[5512.]—**Chimney Stalk.**—From the description given by "Builder," I should say the rents are due to the fire-brick lining not being carried up thick or high enough. The thickness of stalk at the bottom is barely that which I should have recommended. How was the fire-brick lining set—was it well flushed up with fire-clay? I should like to know further particulars—how the iron hoops were fixed, &c.—G. H. G.

[5512.]—**Chimney Stalk.**—"W. S.," replying to another querist, says that the cause of the fractures in the chimney may have been that "the inner lining of fire-brick has been allowed to touch the shaft." I always, in my own practice, finish off the top of the fire-brick lining with a course or two of headers touching the inner face of the brickwork of shaft, so as to cover over the space between, to prevent it being filled with the flue dust. Is this a proper method?—R.

[5515.]—**Fastening Railing to Stone.**—I find that sulphur expands, and know several instances of stone coping, 12in. by 12in., in which the iron railing is run in with sulphur, and the stone is split from end to end. This is supposed to be caused by a chemical combination between iron and sulphur.—T. H.

[5515.]—**Fastening Railing to Stone.**—Ironwork, such as railings, run with lead is apt to become injurious; the iron is found to be eaten away at the junction of the two metals, and every old railing, if examined, will show this effect. This effect is due to a galvanic action that takes place between the metals, which is facilitated by moisture. Sulphur is therefore the best substance, although not often used. As good a fixing can be made with it as with lead.—G. H. G.

[5516.]—**Contracts.**—An answer to this question much depends on the terms of acceptance of tender and the contract. Under ordinary circumstances the accepted contractor can claim compensation for delay if he can show that he has been put to loss or inconvenience, as, for, instance, in the purchase of material, hire of labourers, &c. "Gath" should carefully read the contract or specification before taking steps.—G.

[5519.]—**Macadam Roads.**—The best material is Guernsey granite, broken into pieces so as to pass through a 2½in. mesh. Hand-breaking is preferred. See BUILDING NEWS, Vol. 1858, and other recent articles on macadam paving. Limestone, whinstone, and other materials are sometimes used. The cost of the process was given, I believe, in the report of the Association of Borough Surveyors the year before last.—G. H.

[5520.]—**North Point.**—In large plans the true meridian should be laid down—that is, the true north point is 22° east of the magnetic meridian, though in ordinary surveys the variation is not attended to. The magnetic meridian makes an angle of 22° with the true meridian of London.—G. H. G.

[5523.]—**Dry Rot.**—This is a fungoid growth feeding upon the fibre and tissue of the wood, and, like other plant life, is dependent upon the presence of heat and moisture. If both or even one of these essentials can be removed, the dry rot will be arrested. If this action cannot be taken, solutions are of little use, if intended to be used as surface washes upon wood already affected with this parasitic disease; but any efforts made by "W. H." must be in the direction of applying solutions that will fill up the cells of the wood, and be poisonous to any secondary form of vegetable life. The virtue of creosote oil—and, indeed, all other preservative compounds—rests upon this detail, but they are only partially effective when applied without pressure. "W. H.," in making this inquiry, should state the details of the position and circumstances attending the wood, the dry rot in or upon which he is anxious to arrest.—W. H.

LEGAL INTELLIGENCE.

MORTAR WITHOUT LIME.—At Edmonton Petty Sessions, on the 23rd ult., Frederick Bryen, 139, Junction-road, Holloway, was summoned for using mortar in buildings in Manor-road, Coleraine-park, Tottenham, which had not been approved by the local board of health, as required by their bye-law No. 106. Mr. Crowne, clerk to the board, in opening the case asked the bench to inflict, should they consider the case proved, the highest penalty named in the Act for the offence, as a deterrent to others, there being at the present time between 2,000 and 3,000 houses in course of erection at Tottenham. Mr. de Pape, surveyor to the board, produced samples of the mortar being used in the buildings in Manor-road in course of erection by defendant. No. 1 was the top spot on the ground being excavated for building purposes, and contained roots of the last crop grown on the land. This was put into a mortar mill with a small quantity of burnt ballast, and the two ground together formed the mortar that was used. Nos. 2, 3, and 4 were samples of mortar from between the bricks, the last sample being from the house in respect to which the case was brought. Witness swore there was not any lime whatever in the mortar, and crumbled the samples into fragments between his fingers. He added that when he complained to the foreman he was told the material was only for the plasterers, but that he afterwards saw the mortar taken from the mill and used by the bricklayers. He again complained, and was told it should not recur, but he produced samples of the stuff used since, which was equally bad. The bench held it a bad case fully proved, and inflicted the full penalty of £5 and costs, intimating that if the material were used again defendant would be liable to a further fine of 40s. per day.

The restoration of the exterior of the south transept of York Minster is proceeding satisfactorily, under Mr. Street's directions. The works in the east aisle are completed, and when the unsightly Wills-office has been removed those in the west aisle will be finished. The central arch of the transept, containing the famous rosette window, is under restoration now. Four new octagonal pinnacles have been added to the east and west aisles. The stone used is a particular description of magnesian limestone from Jackdaw Cragg quarries, near Tadcaster.

The clock and clock tower at Westminster Palace, which have been under the hands of artisans for more than a twelvemonth past, were on Monday relieved of the scaffolding. The tower has been regilded, and the clock has been cleaned and repaired.

The City of London School Committee, to whom has been referred the question of accommodation for the school, have held a series of meetings on the subject, which has had especial attention. They have agreed upon a report to the Court of Common Council, the principal point in which is a recommendation that this ancient educational foundation of John Carpenter shall be removed from its old site in Honey-lane Market to a new site on the Thames Embankment, adjacent to the Royal Hotel. It is estimated that the old site will produce upwards of £100,000. Except as to any questions which may arise out of the choice of the new site, with the interests affected thereby, the proposal will probably command the hearty assent of the Corporation, as it has long been evident that the school has been restricted and cramped in its work by the unsuitability of its present site. Not only with respect to the health of the boys, but also to the maintenance of the high position of the school among the educational establishments of the country, its removal to some less confined site is absolutely necessary—a fact which must have been obvious to all who have been crowded in the school theatre on prize days.—*City Press.*

New schools at Goginan, Cardiganshire, have been opened. They are of local grey stone, with blue Staffordshire brick dressings around the windows, and roofed with Aberllefenny slate. The buildings are from the plans of Mr. Walter W. Thomas, architect, of Liverpool and Aberystwyth, and have cost £1,042. The builder is Mr. Thomas Jones, Dole.

The first stone of the new church of St. Peter, Clifton Wood, Bristol, was laid last week. The church will accommodate about 900 or 1,000 persons. The style of the building will be Early Gothic. The architects are Messrs. F. W. Voysey and F. W. Wills, and the first portion of the work has been entrusted to Mr. E. J. Hatherly, of Stoke's Croft. The cost is estimated at about £8,000.

The parish church of Loose was reopened on Michaelmas-day after restoration, from partial destruction by fire, at a cost of £1,064. Mr. G. Ruck, of Maidstone, was the architect, and Mr. Wood, of Boughton, Monchelsea, the builder.

An aisle is being added to St. John's Church, Knaphill, near Woking, from the designs of Messrs. Welman and Street, architects, of Godalming. The cost of this and other improvements in progress in the church will be £1,400.

Our Office Table.

THE Corporation of Ipswich discussed on Wednesday week what steps should be taken with reference to the town museum, as the lease of the premises in which it has been located since its establishment in 1847, will expire in October, 1879, and cannot be renewed on favourable terms. Founded by the Rev. W. Kirby, the entomologist, and largely developed by Professor Henslow, botanist and geologist (the utiliser of coprolites for manure), the collection is a large and well-arranged one, and under the energetic efforts of the present curator, Dr. J. E. Taylor, the Ipswich museum well maintains the high position it attained many years since amongst provincial institutions of its class. For a new home for the museum, public library, and the science and art schools, two proposals were put forward by the museum committee. The first was to alter the public hall—a white elephant purchased by the Town Council at £4,500 a few years since, ostensibly for museum purposes. This building—Mr. Frederick Barnes reported to the committee, by whom he had been consulted—could be conveniently and efficiently converted for an outlay of about £2,000. The second scheme was to build on a vacant piece of ground on the west side of High-street, containing 90 rods, and having a frontage of 225ft., which is offered for this special purpose by the Rev. Edmond Hollond, at £875, the price given for it many years ago. For a building on part of this site Mr. E. F. Bisshopp had prepared plans showing a central parallelogram with annexes, in a Renaissance style, giving the required accommodation, at a cost for premises and land of £8,100. To carry out this scheme £2,500 would have to be raised by private subscription, the borrowing powers of the Corporation, on a thirty years' museum rate, being only equivalent to £5,600. After a long discussion, it was unanimously decided to adopt the High-street scheme, provided the necessary subscriptions can be obtained. Sir Richard Wallace, M.P., has offered to start the list with £500, and as the county town of Suffolk has shown her public spirit during the past twenty years by providing new grammar schools, arboreta, cattle-market, and the most complete group of municipal buildings in East Anglia, and is now working out schemes of sewerage, corn-market, and dock extension, in order to keep pace with the increase of population and commerce, there seems little doubt that the necessary amount will be raised.

THERE is now hardly any doubt that the Weaver's Tower, at Newcastle-on-Tyne, will not be destroyed to make room for the New Free Library. The letters which have appeared in our own columns and elsewhere have stirred up the townspeople of Newcastle, and an enthusiastic meeting was held on Monday night, at which a resolution was adopted requesting the Town Council not to sanction the removal of the tower. The local journals have aided the efforts of the objectors to the contemplated act of vandalism with their influence, and as there is no doubt that the Free Library can easily be built without involving the destruction of the interesting relic of old Newcastle, it may reasonably be hoped that the library committee will set to work and remodel their plans. The members seem to have been singularly unfortunate in their adoption of measures to bring about their object during the time they have been in office. Possibly they have been as careless of the susceptibilities of those who differed from them as in the present instance, and have thus encountered needless opposition.

THE foundation stone of the proposed railway bridge across the Firth of Forth was laid on Monday by Mrs. Bouch, wife of the engineer of the undertaking. The ceremony took place on the Island of Inchgarvie, which is about equidistant from North and South Queensferry, and the stone was laid on the site of the middle pier. The bridge, starting from abutments on the high ground overlooking the foreshores on either side of the Firth, is to be carried in the form of a light lattice-girder structure, upon cylindrical brick columns, to the edge of the deep water. So far, the work presents no features of difficulty: but in the two great spans

which are to form the central portion of the structure, there has to be faced one of the most formidable problems of modern engineering. At the point on each side of the estuary where the bottom begins to shelve rapidly downward, there is to be placed an immense composite pier, consisting of four groups of iron columns—sixteen columns in all—firmly bedded on basements of masonry, and securely braced together throughout their entire height. Over the tops of these piers will be carried immense chains, whose shoreward ends will be anchored to ponderous masses of masonry; and these being continued over two similar piers, placed on the island of Inchgarvie in mid-channel will afford, on the suspension principle, such assistance as is estimated to be required in supporting the spans, which, of course, will also rest at either end upon the framework of the piers. The height of the great 1,600ft. spans has been fixed by the Board of Trade at 150ft., to reach which level the shoreward sections will require, as in the case of the Tay Bridge, to have a certain gradient; and when it is added that the piers will reach the height of from 500 to 600ft., some idea may be formed of the appearance which the completed structure will present at ebb tide.

The Bermondsey vestry considered on Monday week a nice point raised by their surveyor as to a clause in the Metropolis Local Management and Building Acts' Amendment Act. The surveyor reported the receipt of an application for the erection of two warehouses in Mill-lane, and that the plans showed buildings of a basement level lower than allowed by the Act, and projecting within 20ft. of the centre of the road, contrary to the Act. A provision stipulated that the Act should not affect any house which had been lawfully occupied prior to the passing of the Act. The question arose whether the proposed buildings came under this clause. The vestry refused to pass the plans as to basement levels, and referred the question of street frontage to the Metropolitan Board of Works.

We happen to have had the opportunity of perusing a number of letters written by architects anxious to obtain the commission for erecting a new church likely to be built shortly not a hundred miles from London. The inducements held out by some of the aspirants are amusing though somewhat unprofessional. One gentleman offers a stained glass window, another a donation of fifty pounds to the building fund, while nearly all send references as to character and ability in the shape of illustrations of executed works. Competitors will, doubtless, be glad to hear that these are being carefully preserved, and will be placed in the hands of the local man who it is already settled is to do the work, and who will be expected to make the best use possible of the suggestions thus afforded him. This gentleman's principal recommendation is that he has no objection to be guided in all things by the probable principal member of the building committee, who, though less acquainted with the arts of construction than those of destruction, yet, as the vicar remarked, "has such excellent taste, and will be so useful in deciding matters of style, &c."

On Tuesday the Mayor of Reading opened a loan exhibition of oil and water-colour paintings, engravings, and photographs, in Victoria Hall, in that town. The collection is large and valuable, and comprises the works of many old and modern masters, including Vandyck, Titian, Rubens, Gainsborough, Canaletti, Sir John Gilbert, Millais, Birket Foster, Rivière, and Teniers. There are several pictures which attracted considerable notice when exhibited at the Royal Academy this year. The exhibition has been got up for the purpose of encouraging and developing a taste for higher art among the working classes, a similar exhibition held in the town four years ago having been attended with unexpected success. In opening the exhibition the Mayor spoke of the great value of such undertakings, and expressed a hope that the aims which they had in view would be fully realised.

A silver medal, the freedom of the company, and, with the consent of the Court of Aldermen, the freedom of the City of London, are this year offered as prizes by the Company of Turners for the best specimen of hand-turning in wood, and diamond-cutting and polishing. The competition is open to all workmen—whether masters, journeymen, or apprentices—of the trade in England. A large medal will be given as second prize, and certificates and rewards in money will be assigned to competitors according to merit. The freedom of the company, a sum of money, and, with the consent of the Court of Aldermen, the freedom of the City are also offered for the best piece of pottery thrown on the wheel in one piece without joints, and not afterwards shaved or turned in any way or glazed; and silver medals, a bronze medal, certificates of merit, and money prizes for proficiency in the art in other respects. The Baroness Burdett-Coutts, who is a member of the company, has placed £20 at the disposal of the court for competition in diamond-cutting and polishing, and £15 towards the wood, and £15 towards the pottery money prizes, while the court itself contributes £50.

The slate trade, the staple industry of North Wales, which has been very dull for some time, several quarries being wholly or partly closed, now presents a slight improvement in certain districts, as indicated by the returns of shipments presented at Tuesday's meeting of Carnarvon Harbour trustees. In August 10,956 tons of slate were shipped from that port, against 7,682 tons for the corresponding month last year. At Bangor and Port Dinorwic, the shipping ports for the extensive Bethesda and Llanberis quarries, shipowners still complain of the difficulty of obtaining freights, and the like complaint has long proceeded from Port Madoc, the outlet for the quarries in the Festiniog district. The shipping trade of the latter port will be materially affected by the opening of the branch line connecting Festiniog and the London and North-Western Railway system at Bettws-y-Cold, which is now nearly completed.

The University College courses of "Lectures on Architecture and Construction," by Professor T. Hayter Lewis, F.S.A., commence on the 8th instant. The course on Construction includes the usual subjects, and the lectures are delivered every Tuesday, from 6 to 7 p.m., to the end of the session—15 lectures in all. The Fine Art series are delivered every Tuesday, from 7.10 to 8.10 p.m., and include Ancient Architecture, Mediæval, and Renaissance. The fee for one series is £3 13s. 6d., or the entire course £11 11s.

Among other curious products of Jamaica brought home by travellers, specimens of the "vegetable lace" of that island are to be found. The plant which produces this is the Lagetta lintearia (formerly called Daphne lagetta), or lace-bark tree, otherwise known by the native name of lagetto. It is a small tree, 25ft. to 30ft. high, growing in the most inaccessible rocky places of the island. Its inner bark consists of numerous concentric layers of fibre, which interlace in every direction, forming fine meshes, and by lateral stretching is made to present a striking resemblance to the most delicate manufactured lace, whence the common name of the tree. It is said that Charles II. received as a present from the Governor of Jamaica a cravat, frill, and pair of ruffles, made of this material; and to this day it is used for bonnets, collars, and other articles of apparel. Travellers state that the Creole women take delight in decorating themselves with this filmy material for evening wear, studding it with the brilliant fire beetles, or *cucujos*, for which the West Indies are noted. The effect is said to be very beautiful.

CHIPS.

The parish church of St. Mary, Cheadle, has been partially restored under the direction of Messrs. Medland and Henry Taylor—Mr. T. Wharam, of Hyde, being the builder.

A new Wesleyan chapel was opened last week at Sowerby. It is in the Classic style, and has been built from the designs of Mr. T. L. Patchett, of Halifax. The cost of chapel and schools is about £3,800. The chapel will accommodate 550 persons.

An exhibition of pictures by living artists is on view at the Victoria Hall, Norwich. Amongst the exhibits are works by E. W. Cooke, R.A.R., Ansdell, R.A., W. Callow, and many local painters, professional and amateur, indicating the vitality of the Norwich School.

In a postcript to a letter on another matter in a St. Alban's paper Sir Edmund Beckett writes:—"Let me add a line on a very different subject, or it may be thought that, as I am writing, I acquiesce in a wonderful paragraph which you copied from the *Athenæum* last week, that I have been appointed architect for the further restoration of York Minster, instead of Mr. Street. It is a mere piece of nonsense. It oddly happens that the Minster is the only church in that diocese over the alterations of which I have no jurisdiction as chancellor thereof. If I had, I should certainly not have allowed the alterations he has made there under his favourite pretence of 'conservative restoration.'"

St. Michael's Home, Cheddar, was formally opened on Saturday. The site was purchased and the whole cost of construction has been defrayed by Mrs. Wm. Gibbs, of Tyntesfield, and is intended to afford accommodation for 24 incurable patients.

The Friendly Societies' Hall, Tunbridge Wells, was formally opened on Thursday evening, the 26th ult. It has been built from the designs of Messrs. Week and Hughes, by Mr. Henry Elwig, chief contractor.

The parish church of Longham, Norfolk, was re-opened on the 19th ult., after restoration. The unsightly high pews of painted deal have been removed, and in their stead have been erected pitch-pine sittings, designed by Mr. Dunt, of Witchingham, and executed by Mr. Brown, of the same place. The new pulpit, reading-desk, and lectern, all in oak, have been designed and carved by Mr. Chapman, of Hanworth.

The gasworks at Lowestoft are in course of enlargement and extension. Last week the contractor, Mr. John Downing, of Norwich, gave a dinner to his employés in celebration of the successful roof-raising.

The battery pier at Douglas, Isle of Man, is approaching completion. Last week the first concrete block above high-water mark at the extreme end of the pier was laid by Mrs. Powell, wife of the resident engineer for the undertaking.

The meeting of the Royal Historical and Archæological Society of Ireland was held in Cork city, on Wednesday.

For the erection of railway station offices at Ramsey, Isle of Man, the tender of Messrs. Boyde Brothers, of that town, has been accepted.

A new school has been erected for the Bath School Board in St. Mark's district, Holloway. Messrs. Morris and Son, were the contractors; the total cost of erection was £1,960, which, together with net cost of site, £441, makes an outlay of £8 12s. 2d. per head of accommodation afforded.

It is proposed to hold an art exhibition at Hull during the present month, the object being to provide funds for the fitting up of a house in Albion-street as a permanent home for the Hull School of Art.

Messrs. J. Shaw and Sons, of New Leeds, Bradford, have completed the casting of eight bells, to be placed in the tower of St. James's Church, Bolton-by-Bradford.

The memorial stones of a new Welsh Calvinistic Methodist chapel were laid at Pentre Broughton on Monday week. The chapel is to be constructed of Ross stone, in Gothic style, from the designs of Mr. Howel Davies, of Wrexham. It will be 44ft. by 27ft., and will be seated in pitch-pine for 250 worshippers. Mr. Peleg Jones, of Eirianva, near Broughton, has taken the contract for erection at £800.

Woodstock parish church will be reopened on Monday next, the extensive alterations and restorations having been completed.

The Great Eastern Railway Company are carrying out extensive dock, quay, and railway works at Ray Island, near Dovercourt, to which place we understand they propose, 18 months hence, to remove their Continental traffic from Harwich. Mr. Ridley, the contractor, is employing for the purpose of expediting the removal of earth one of Messrs. Dunbar and Ruston's patent steam navvies, a machine better known by the sobriquet of the "American Devil." There are about 130 men employed; the amount of the contract is £10,000, and it is to be completed in three years.

The Hull Town Council passed on Monday week an instruction to the works committee that in future all tenements shall be built not only with a back way 3ft. wide, but that the privies shall be constructed with pans and doors according to a plan recommended by the borough engineer, medical officer of health, and town clerk.

A masonic hall is in course of construction in Mullingar. Mr. Meldon, of Dublin, is the contractor.

A stained glass window is about to be placed in the collegiate church of St. Paul, Clare, West Suffolk. The subject is Christ Blessing Little Children. The work is being executed by Messrs. Pitman and Cuthbertson, of Newgate-street, E.C.

A new Primitive Methodist chapel, erected from the designs of Mr. G. Baker, of Great Yarmouth, was opened at Halvergate, East Norfolk, on Sunday week.

A new deep-water quay was commenced at Queenstown, county Cork, on Monday. Mr. John Delany is the contractor.

The Church of St. John Baptist, Eltham, has just been enriched by the filling in of the four detached lancet lights at the west end with stained glass representing scenes in the life of the patron saint, and of the rose window above with cherubim heads. Screens of ironwork have also been erected on the north and south sides of chancel.

The new Congregational church at Walton-on-the-Naze, built from the designs of Mr. Chas. Pertwee, of Chelmsford, was opened on the 18th ult. The style is 14th century Gothic; it is 58ft. by 31ft. internal measurement, seats from 300 to 400 persons, and cost £1,000 in erection. Messrs. Saunders and Son, of Dedham, were the contractors.

The Doncaster rural sanitary authority have accepted the tender of Mr. Freeman, of Pontefract, for the construction of a public sewer for the special district of Wheatley.

A permanent church of St. George has been commenced at Perry Hill, Catford, S.E. Mr. Banks is the architect; the edifice will cost about £8,000.

The Southend-on-Sea local board have appointed Mr. Harrington, of Rochford, as surveyor and inspector of nuisances, at a salary of £150 a year.

The parish church of All Saints, Mullingar, was reopened on Wednesday week after extensive alterations carried out from the designs of Mr. Thos. Drew, of Dublin, at a cost of £2,000. The restoration has been carried out by Mr. Hugh Hague, of Cavan.

A statue of Robert Raikes, the founder of Sunday schools, is being executed for the subscribers by Mr. Brock, of Osnaburg-street, Regent's-park. The Metropolitan Board of Works have been memorialised to grant a site for the statue, when completed, in the Embankment Gardens.

The new basin recently added to the harbour of Macduff, at the expense of Lord Macduff, M.P., was publicly opened on Friday. Mr. Farquharson was the resident engineer.

The Mayor of Swansea received yesterday, on behalf of the town, formal possession of the Knap Llwyd field, given by Mr. J. D. Llewelyn, as a place of recreation for the inhabitants of Swansea. The Park Llewelyn, as the grounds will hereafter be known, forms an area 40 acres in extent, on the top of a hill at Llandore. It has been drained and planted with a ring of poplars, and an inner circle of shrubs. A circular drive and paths have also been made.

A new hall connected with the west parish church at Airdrie, N.B., was opened on Monday. It has been erected from the designs of Mr. A. M'Gregor Mitchell, architect, of Airdrie.

Messrs. Brady and Mills, the engineers respectively of the South-Eastern and London, Chatham, and Dover Railway Companies, made a formal inspection on Wednesday week of the works of the Dover and Deal Railway, now rapidly progressing towards completion, in company with Mr. Brady, jun., the engineer, and Mr. Walker, the contractor for the new line.

The parish church of Overton, Wilts, was reopened on Wednesday week, having been entirely rebuilt from the designs and under the supervision of Mr. Charles E. Ponting, agent and architect to the estate of Sir Henry Meux. The chancel has been rebuilt on the old foundations, and by an extension of one bay in length eastward, and the addition of a north aisle, extra accommodation has been afforded. The rebuilding has been executed chiefly by the estate workmen.

The committee of the Elgin School of Art met on Monday to appoint a teacher in succession to Mr. Edward Fraser, who resigned consequent on being nominated drawing master in the new Kelvinside Academy for Glasgow. Specimens of draughtsmanship, exhibited by numerous candidates, having been examined, the choice fell on Mr. David S. Grubb, one of three brothers, who have brought the Dundee School of Art to its present high state of efficiency.

Trinity Church, Derby, is about to be reopened after restoration, including substitution of open pitch pine seats for high pews, provision for three fresh entrances and exits, and the laying of the space in front of the communion rails with encaustic tiles. Mr. J. Wood has the contract for reseating, and Mr. W. Twells that for painting.

Plans prepared by Mr. Barnes, F.R.I.B.A., of Ipswich, for a new pulpit, platform, and choir seats, and other alterations consequent on the erection of a new organ, have been approved of by the congregation of Friars-street chapel, Sudbury.

During the progress of a restoration now being carried out at Orchard Leigh Church, Wilts, a singular 13th century pewter chalice has been found.

The foundation stone of a new church was laid at Sandown on the 26th of September by Lady Oglander, the lady of the manor. The length of the building will be 112ft., and the width 58ft., and will consist of nave, north and south aisles, chancel and vestry, with a heating chamber under vestry. The building will seat about 600, and will be built of local stone. Portland stone will be used for nave columns, caps, and bases. The style of architecture is Early English. Mr. C. L. Luck, of Carlton Chambers, Regent-street, London, is the architect, and Mr. Barton, of Ryde, the builder; Mr. T. Vaughan is the clerk of works. The cost will be between £6,000 and £7,000.

A new organ chamber and an enlarged organ were opened at St. Lawrence Church, Ipswich, on Thursday, the 26th ult. The new chamber occupies the site of a vestry on the north side of chancel, and a brass plate, 6ft. 6in. by 1ft. 8in., let into the chancel wall, records that the enlargement is carried out as a memorial to the late Rev. T. Cobbold Aldrich, M.A., for 40 years incumbent. At the same time the lath and plaster ceiling of the chancel has been replaced by a boarded one of oak. The alterations have been carried out from the designs of Mr. Frederick Barnes, of Ipswich, by Mr. Girling, of the same town; the cost has been £600.

The Bishop of Oxford consecrated on the 24th ult. the new chancel of the church of St. Mary, Upton-cum Chalvey, Slough, erected from designs by Mr. John Oldrid Scott.

Headgate Chapel, Colchester, was reopened on Thursday week after internal renovation. An apse has been formed at the west end, in which the organ has been placed, and immediately in front is a new organ. The area of the chapel has been rebenched, and the galleries and walls decorated. Mr. H. Baker, of Colchester, was the architect, and Mr. G. Lee the contractor. The cost was about £700.

The stipendiary of Merthyr Tydfil had to decide on Monday what constitutes a "merchant," the overseers having returned amongst the special jurors, with the qualification "merchant," two Merthyr ironmongers and a jeweller, and Mr. Charles Taylor, architect. He announced that a merchant was described in a number of dictionaries and by the superior courts as a person who sells and traffics with foreign countries, or imports or exports, or sells by retail. Evidence as to each case having been heard, all the names were retained on the list except that of the architect.

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Important references and all particulars from the patentee, T. W. HELLIWELL, Brighouse, Yorkshire; and 19, Parliament-street, London.—[ADVT.]

Trade News.

WAGES MOVEMENT.

ABERDEEN.—At a final meeting, on Monday night, of the house carpenters and joiners of Aberdeen, it was resolved to come out on strike on the following day against a proposed reduction of ½d. per hour. This affects about 500 men. The masters' association also held a meeting on Monday, and resolved to adhere to the reduction.

EDINBURGH.—The strike of the Edinburgh plasterers has come to an end, the men having accepted a reduction of 1d. per hour in wages.

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THE BUILDING NEWS.

LONDON, FRIDAY, OCTOBER 11, 1878.

A DAIRY HOMESTEAD COMPETITION.

THE reproach occasionally levelled at some landholders in England, that their dogs and horses were better lodged than their labourers, can hardly affect farmers. For the most part—at any rate till recently—the conditions under which agriculture has been pursued have been all bad alike. Men and animals together had to put up with accommodation which served the needs of their predecessors in bygone days, when farming was conducted in the old-world fashion, and when those who followed it had neither the education nor the opportunities of their representatives of the present day. As might have been expected, the improvement in the social condition of farmers, and in the methods of cultivation now in vogue, has been followed by a perception of the necessity for improved homesteads. In this department of construction there is probably a greater lack of information than in any other of equal importance. Seldom, among the thousands of drawings sent to us for illustration, is such a thing to be found as a perspective or sheet of details of a new or restored farmhouse or dairy homestead. Such examples have not been altogether absent from our pages, but they have been rare, and we think those who have had occasion to seek information of the kind from other sources will agree with us that it is equally uncommon. It was, therefore, with more than ordinary interest that we inspected an important exhibition of drawings and models for dairy homesteads which was opened yesterday at the Agricultural Hall, in connection with the British Dairy Farmers' Association. As the plans and models were only unpacked and arranged yesterday in the gallery of the hall at Islington, we are unable to give to-day more than a general description of a few of the more important of them in competition for the silver and bronze medals and money prizes offered by the Association. The instructions issued were of a very general kind, and each competitor was free to adopt his own arrangements. No size of farm or number of cows was given, and the result is that the plans exhibit various ideas as to area and position of the buildings.

Among the improvements introduced recently in farm-steadings, particularly in Scotland, is that of feeding the stock in covered instead of open courts, with convenient feeding passages, well ventilated, and in easy communication with the food-preparing houses. This plan is widely extending. We find that most of the plans have adopted this principle, though the advantage is not always made the most of. One of the best designs is sent in under the rather cumbrous motto, "There they wait their wonted provender, not like hungry man, fretful if not supplied, but gentle, meek, and silent," &c. (Mr. Jas. Cowie, of Bromley, Kent.) The author, in accordance with the experience of farming authorities, has arranged his buildings and sheds for live stock, &c., under one roof, or a continuation of roofs, and has so disposed his roots and straw that the labour of attendance is minimised. We may simply describe the plan as ⊔ shaped, the long principal range being covered with a double-span roof, traversed from end to end by a tramway, along which are placed a series of single stalls for cows, 25 on each side of centre, with the stores for roots at each end readily accessible. At right angles at the extremities in rear project two wings. The left one contains the infirmary at the extreme end, poultry, piggeries, potato-store; in the right wing, which is wider, there is a cow-house, with a double row of stalls for 12 cows, 55ft. by 36ft., with a centre tramway communicating with the longitudinal one of the main range, and being in communication with the root-store, stables, &c. In the centre behind there is another wing, occupied by the corn and straw-barns, implements, calving-house, &c., also accessible by turntables with the chief lines. In front of the main range first described are, on left of centre at the end, a cart-shed opening in front; next the cheese, milk and churning-rooms, the bailiff's and dairyman's house (in centre), the right half being occupied by a harness-room, stables, and provender, with necessary cross passages. Isolated at the back, between the centre and end limbs of the building, is a manure court, with receptacle for liquid refuse. Each half of the front building devoted to the cow-houses is 100ft. by 20ft. The sheds are generally 20ft. wide, and the roofs are high-pitched, with ventilating skylights along the ridge, and with windows at the side. There is certainly economy in the distribution of the plan as regards the provender, which is thus disposed at the extreme ends of building and the centre. The milk-room in front is 27ft. by 20ft., the tramway passing through it, and the adjacent cheese-making and churning-rooms, and these communicate with the dairyman's yard. The external design is in a plain but sensible style of red brick and tile, with half-gabled ends, the bailiff's house being of brick below, and timber and concrete in the upper story. A well-tinted bird's-eye view is given.

"Industry" provides for eighty cows. The plan shows the stalls ranged under a long-roofed shed, with centre passage for feeding, the roots and mixing-room being at one end, where the shed adjoins at right angles to the other portion of the farmstead. We do not like the disposition of the buildings, and we think if the stalls had not been in one row, but divided, the labour of the feeding would have been reduced. The straw-yard is between two ranges of buildings, and convenient.

Undoubtedly, one of the most economical plans is that of "Ich Dien," by Mr. Murray, of the Elviston Estate Office, Derby. It is economical in the disposition of yards, which are covered, and comprise with the sheds five parallel span roofs—the waggons, milk, chaff, roots, and carts being provided for in a long shed at right angles to the stalls, and very accessible. A tramway passes along the food-preparing department, and is connected with the centre and end ranges of stalls. There are a double range of cow stalls in the centre building, with the usual footpath for feeding. Water troughs have been provided in each of the side yards, and the whole area is ventilated and lighted by top lights. The barn conveniently projects from the food-preparing shed. We find the dairy arrangement is limited, though there, as the author observes, dairy-farming is in a transitional state—milk-selling is becoming general, and cheese-making in the farm-house is not so general as it used to be. For the interior divisions wood and iron are suggested, and the fences are of gas-pipe with iron standards. Stalls and mangers and the roof principals are of iron, cast-iron columns carrying the roofs over the side yards. These are hollow, and act as rain water-pipes. Slate is proposed as a covering. The author appears to have studied economy of labour and moderate cost in erection, without regard for external appearance.

"Royal Oak" is the motto of another clever arrangement. The yard is covered by a roof, supported on columns. On two sides, meeting at a right angle, are placed the cow-sheds, each for 32 cows, with the food-preparing house at the corner. The stable and piggeries are contained in a similar arrangement of sheds at the opposite angle, thus forming a rectangular cow-yard in the centre. We noticed that each of the cow-houses has a centre passage leading into the yard, and the hay and straw sheds are conveniently placed opposite to them. The stalls are arranged in four rows for eight cows each. Looking at the food-preparing department we find the practical details have been studied and the machinery shown—this is to be by horse-power. The chaff-cutter, mill, and tank are placed in an upper floor over the mixing floor and chop-house. The dairy is small, the cheese-room being above it, but the plan of this part is scarcely so happy as the feeding stalls and yards.

"A 101" has a quadrangular plan, nearly square, the cow-houses on three sides of an open yard, with feeding passages running along behind the stalls; the calves' houses are the corners; the food house in the centre, on one side; the infirmary and piggeries are placed on the fourth side; projecting at the angles of the cow-sheds are the hay and straw stores. For an open yard the plan is economical. Elevations are below par. We notice "Stet" in circle shown by a large perspective. The plan is more complex and less economical. The double yard intercommunicating is laid with tramways, the cow-stalls and sheds forming a kind of double quadrangle. Centre feeding passages are adopted. One of the main features is an octagon milk-house, with double roof. A hasty inspection of the plans inclines us to think this design would be rather costly, and not so economical as others in the exhibition. "Bloomsbury" is another large plan. The cows are located in a centre range, the roots, and grain, and stores forming three sides of an enclosed rectangle. The names of the judges appointed to select the prize plans are, we believe, Messrs. Barnard, architect; M. Nuttall, Leicester; J. C. Morton, of the *Agricultural Gazette*; and W. T. Carrington, Uttoxeter. We understand Mr. Bailey Denton has declined.

The exhibition is well worth the inspection of architects and others interested in dairy-farm construction, and we trust next week to give more attention to the details of some of the plans submitted than we have been able to do on the present occasion.

DESIGNING BY PROXY.

IN the designing of the elevations of a building the architect has, if he thoroughly understand his art, to consult not only the exigencies of his plan, but those rules of architecture which an able writer on æsthetics has aptly designated under the generic term of "politeness in building." In actual buildings it is nothing remarkable to notice a singular disregard of the public sense of propriety and order. The flank or back elevations of a public hall, a theatre, or music-hall, are often notoriously outrageous in this respect. The front portico or columnar façade, enriched with all the accessories of Classic or Italian ordinances and carving, the flanking towers, and other aids to architectural effect, are but customary artifices employed to impress and overpower the popular mind. The policy of expediency in architectural art—that of putting on the best face to the principal street, and ignoring all the other sides—is now too familiar to modern architects and artists, and is the one pre-eminent sign which separates and distinguishes the art of the nineteenth century from all which has preceded it. In the architecture of the Athenian Republic, in that of the Cæsars, of the Middle Ages, and the Renaissance,

the use of a sham front—a mask to plain walls—never occurred to the architect. Architecture was a thorough art with the Greeks, the Romans, and the mediæval builders. It was impossible to think of building and architecture as separate elements in the manner we moderns do. The column and entablature, the pediment, the pilaster, arch, and vault, were looked upon, not as ornaments, but as methods of building and of distributing the material. In latter times, it is true, the cinquecentists masked their façades and superposed their orders; but it would have been thought a miserable subterfuge of poverty or lack of invention to stick all the detail upon one front, as we do now. A building with one grand front, and the other sides shorn down to barn-like plainness, is an insult to the public and a contemptuous satire upon architectural honesty. It is a reproach to every high or moral sense of truthfulness. Yet how few of the designers of competition works which we have seen of late have not been led into the snare, or, to speak more truly, have not boldly and unblushingly adopted it! The competing architect knows very well that he is more likely to captivate by concentrating all his resources upon one façade than if he were to distribute the thought and labour over every side of his design. Let us take as an example the Great Yarmouth municipal offices. There each side of the building has an equal claim upon the attention of the designer; but if we interpret one-half of the designs aright, and especially if we take the probable cost of them into consideration, it is very clear that the rear and lateral façades would have to be robbed to pay for the river front. In such a site as that for the Kensington Vestry Hall the architectural display is necessarily confined to the main front towards the street, and the architect has a better opportunity for ornamentation. It is surprising to find ornament lavished upon elevations which are little better than masks, when the return sides are starved; albeit the trickeries of modern art are such that we cannot question the motive of the artist who seeks to impress and fascinate in such a manner.

But this vice, common to competition architecture, leads to other errors of composition. One of the chief of these is inattention to the connection or principle of continuity of the parts. Thus we occasionally find a tower planted in the corner or side of a building to stop the continuation of the horizontal features, or for the purpose of beginning a fresh tune, so to speak. All such artifices are unworthy the name of design—they are tricks to save thought and trouble. We have actually seen such a thing as a chimney-stack stopping a cornice or parapet, or hiding a clumsy gusset-piece of roofing or hip. It is a saddening reflection that architectural vitality is at so low an ebb that it scarcely penetrates the surface of a building. The school of muscular Gothicists has done something to take away this reproach; but when we come to see and understand what it really means, we find, after all, it is more of affectation than reality. We find, for instance, it amounts simply to making a show of internal divisions. We find a large window and gable put up to mark a spacious apartment, a row of small ones to show the position of minor rooms and offices, a tower with a spiral row of apertures to display the stairs, and all kinds of whimsical arrangements of levels, string-courses, and roofs, to exhibit internal purposes. But this is not architecture—it is merely making a fuss to hide want of adapting skill; and it has this fatally inherent weakness—that in some hands it is made an apology for bad planning. In fact, we have discovered more bad plans among the productions of this school of designers than among those who profess the masking business.

But the fact is that architectural designing is, after all, becoming among some men much of a trade. Elevation-design falls to a class of experts who can make a profitable livelihood out of it, and as a slop tailor can fit a ready-made coat on any figure, so the architectural *modiste* can design an elevation to suit any arrangement by either of the two processes we have sketched. The fault is perhaps less with the artist who gets a living out of this system than with the so-called architects who will not think for themselves, who will not design, or who cannot do so. This designing by proxy is doing incalculable mischief to the true interests of architecture—it is taking away the last hope of the profession, reducing the art to the level of a manufacture, and calling into existence a kind of spurious art-agency—a class of men who are utterly ignorant of practical architecture. Can we wonder if the engineer takes advantage of the position, and endeavours to realise the long-anticipated prophecy of critics outside the profession that he is *ipso facto* the real representative of nineteenth-century construction?

THE SANITARY INSTITUTE AT STAFFORD.

THE autumn gathering of the members of this Institute—the second annual congress, held at Stafford during last week—was influentially attended, and the addresses and papers covered an extensive field. Mr. Chadwick's inaugural address was a comprehensive and masterly summary of the progress of sanitary legislation. He touched on a variety of matters, to which we can here but very briefly refer. Mr. Chadwick first reverted to the past and present condition of the county of Stafford. Much of what he said has been uttered before at other congresses; one important fact, however, was that since the formation of the first General Board of Health, with which Mr. Chadwick was connected, now 37 years ago, the death-rate of the county has not been materially reduced, despite the appointment of medical and sanitary officers, town surveyors, and a large expenditure upon improvements. Staffordshire, however, is not alone, as the fact applies generally to the country. Speaking of the rural district of Penkridge, and the districts of Wolverhampton, Dudley, Stoke-upon-Trent, West Bromwich, Walsall, and Uttoxeter, the president said that in all "2,100 deaths of all ages were occasioned in 1876 by the seven chief zymotic or fermenting diseases, accompanied, no doubt, by a tenfold number of cases of sickness from them." These were all infantile death-rates, and the mortality of infants is an unerring test of the sanitary state of a district. Referring to the power of sanitation in lodging-houses and prisons, Mr. Chadwick pointed to well-constructed prisons as the normas of sanitation of adult life, the Stafford county gaol being instanced, where, on the authority of Mr. Greaves, the medical officer, the mortality during the past ten years is stated to have been less than one per thousand, or not a tenth of that of outsiders. Is this a fair criticism, however? Are not the inmates of such places as a rule, for several reasons, unfairly contrasted with the hard-worked and honest lower classes of society? We admit the powers of regular habits, cleanliness, temperance, and a controlled dietary, but is it not equally true that hardiness of constitution is a prevailing condition of our criminal population? As normas of sanitation applied to children the district half-time schools of the metropolis were named, and Mr. Chadwick pointed to the Wolverhampton Orphan Asylum as an especially healthy institution, there only having been two deaths in 13 years out of 650 children. Contrasted with these normas of infantile and adult sanitation, the boarding-out system for paupers involved, it was stated, a sixfold sacrifice of life, or 20 per 1,000. With a population doubled, the preventible deaths are computed as not less than one-fourth of the prevalent death-rate of this county. The obstruction to progress has been mainly owing to imperfect administration. The address dwelt on the importance of making sanitary administration and science a distinct speciality; the need of competent officers of health; the effects of overcrowding in schools; the inspection of workrooms and factories; the greater mortality of the shoemakers of Stafford, who fall victims to zymotic diseases, and the advantages of adopting preventive measures.

Sewage utilisation and water supply was the theme, as usual, which received the largest share of attention. Mr. Edwin Chadwick, C.B., presided, and Mr. J. B. M'Callum, C.E., officiated as secretary. The paper by Mr. R. W. P. Birch, C.E., dwelt upon sewage farming, and gave some details of the land in this country irrigated with sewage by private persons for profit; and 4,000 acres are said to be occupied for this purpose. The use of liquid sewage was advocated. With regard to the "separate system" the speaker thought that in the interest of the sewage farmer the more rain-water kept out of the sewers the better, but this applies more to arable than pasture farms. He also argued that over-feeding with sewage had no ill effect, though land may be choked with it in one meal. The speaker maintained that at no one of the places he mentioned had the sewage farmer been involved in legal proceedings, and that the liability was inconsiderable. Lieut.-Colonel Jones, V.C., in a paper pointed out the paramount importance of considering economy in all cases of sewage disposal. We agree with him in instancing the extravagance of town councils in constructing large sewerage works, which placed them at the mercy of landowners adjoining the outfalls; in employing engineers to build vaulted chambers or tanks, and iron carriers; and the mistake of making the land for irrigation rectilinear in its slopes, whereas any farmer could easily contour his carriers round any curves or sloping banks. He very justly referred also to the useless expense and harm of imprisoning sewer gases in roofed tanks, instead of letting them mix with the air and become innocuous; the removal of sludge from the tanks as a serious labour; and lastly pointed to the mistakes of engineers, saying that nearly every town in the kingdom except Eton, Oxford, and Reading, had still to retreat from a system of combined sewerage and drainage, which, as stated by Mr. Bailey Denton, rendered it impossible to comply with the provisions of the Rivers Pollution Prevention Act. Col. Jones pointed out the great saving which would most certainly have ensued to ratepayers if the old drains for surface water had been allowed to remain, and a system of sewers constructed of a capacity sufficient for their purpose. Mr. H. J. Marten, C.E., in a short paper "On the Drainage of Populous Manufacturing Towns situated upon the Drainage Area of the River Tame and its Tributaries north of Birmingham," corroborated the advantages of a "separate" system as the only effectual mode of dealing with the sewage of populous towns; and stated that if carried out with proper outfalls, he did not despair of the river Tame and its tributaries becoming as free from contamination as other streams which are the charms of the more rural districts. Mr. Marten mentioned West Bromwich, where a separate scheme is proposed at an outlay of £100,000 for 70,000 people; Oldbury, where a similar plan is being executed for

dealing with the sewage of 20,000 persons at a cost of £30,000; Tipton, where the same plan is being matured at a cost of £60,000 for the sewage of 40,000 people; and Dudley, where it is also being carried out. The advantages of the "separate system of town sewerage" were enumerated by Mr. J. Pilbrow, M.I.C.E., as (1) saving in outlay by requiring only small pipe drains; (2) non-dilution, and therefore greater value of sewage at outfall; (3) the small liability of escape of offensive effluvia from drains; (4) avoidance of calamities due to flooding and regurgitation of sewage matter into houses. Mr. Pilbrow considers that the separate system, if adopted in a town for the drainage of houses only, would not exceed one-fifth of the cost of an efficient and perfect system which would take in all surface and storm-water; and with respect to the liability of effluvia from the drains, he thinks the only ventilating process is a pipe immediately on the outside of a house at the head of the drain. Mr. Edward Monson, Assoc. Inst. C.E., in a paper on the same subject remarked on the opposite principles of town drainage inculcated by the General Board of Health and the Metropolitan Commissioners of Sewers. The former Board recommended the separate system, the Commissioners the "combined" plan; and he attributed the sewage difficulty to the latter, and the failure of the Metropolitan system to the same cause. A modification of the separate plan has been adopted by Mr. Monson at Halstead, in Essex, though we have no space to detail it here. A good case was made out for the separation of sewage from rainfall; the water was saved from pollution, and could be utilised for various purposes, while under the combined system it ran to waste, the sewage was increased in bulk, and the community was shocked. We have no space to refer in detail to the paper "On the Sanitary Defects of Old Towns: with an account of the Sanitary History of Stafford," by Messrs. W. Ellis Clendinnen, medical officer, and Mr. J. Braddon M'Callum, the borough surveyor of Stafford. The second part of the paper was the most suggestive, and dealt with a variety of sanitary matters, and the defects of town arrangements. The difficulty of street improvement and widening, owing to increase of the value of property in the centres of our towns, was alluded to as one impediment. The authors maintain the desirable proposition that all extensions and improvements should be made in accordance with a fixed plan in combination with street improvement, so that progress, however slow, should be in the right direction; sunshine, it is justly said, ought to determine the course and direction of a street, so as to aid ventilation.

Referring to road-making the authors recommend for heavy traffic granite sets laid on a slightly yielding foundation, with joints run in with an asphaltic composition—wood is considered less sanitary; for roads of light traffic asphalte macadam, a combination of broken stones with melted coal-pitch and creosote oil, is thought the best. The sanitary defects of dwellings were summed up. Among these were projections at the back, which impede air and obstruct light; covered back-yards, defective air space, cellar dwellings, ashpits and cesspools, drains under dwellings, soil-pipes within houses, imperfect ventilation of same, the unbroken connection of waste-pipes and cisterns in communication with drains, &c. Remedies for these defects of construction were pointed out, but are so well known to our readers that we need not repeat them here. One desirable suggestion was the appointment of a sufficient number of qualified inspectors, who should have power to enter and inspect dwellings periodically; and the compulsory employment of an architect by everybody building a house. It is urged that there is as great a necessity for granting a diploma of competency to architects, and to make it impossible to build a house without an architect, as for a man to practise as a surgeon without legal qualification. The paper also spoke of the value of educating every householder in sanitary and domestic requirements; the objects of the Edinburgh "Sanitary Protection Association," which provides for its members, in return for the payment of a guinea annually, such advice and supervision as shall insure the proper sanitary condition of their dwellings, and other advantages; and of Mr. Raynor's Sanitary Association at Liverpool. Of this last we may add that it has been instrumental in promoting sanitary improvement. The rules in force at Liverpool suggest to the visitor that he should be satisfied that every house has a sufficient and pure water supply; that there is no offensive smell from any drain; that the roof is water-tight; that in each room there should be a window that can be opened; and that the walls and floors are free from damp. If any defect is found the visitor is to induce the Corporation or landlord, as the case may be, to do what is necessary. Sanitary tracts are also issued, which the visitors leave with the families visited, or explain to those requiring it. In the section on "General Hygiene" some suggestive papers were read. Dr. Monckton, of Rugely, spoke also in favour of house inspection. Sir Henry Cole's paper on sanitary co-operation dwelt on the circumlocution and red-tapeism of the Local Government Departments, and in a satirical humour censured the interference of imperial administration with local self-government. Referring to the Rivers Pollution Prevention Act he showed that it was not in the power of a sanitary authority, without the Department's sanction, to put it in force. Sir Henry said it was impossible to remedy the pollution of a river unless there could be effected a federation of interests, and unless we could treat the river from its source to its outlet as a unit, and see that the whole work was done in the interest of all the places which emptied sewage into the river. One of the suggestive papers read was that on "Hospitals for Infectious Diseases," by Mr. Ernest Turner, F.R.I.B.A. He premised the significant fact that so few of the sanitary authorities have availed themselves of the powers Section 131 of the Public Health Act confers upon them in providing hospitals for infectious diseases. Reviewing the chief objections raised against hospitals of this class, Mr. Turner replied to them seriatim. In answer to the objection that a hospital may not be necessary, the author contends that the very essence of such a building is that it should be provided beforehand; it can then be built more economically, and will be more effectual in checking the first cases of disease. As regards another objection—that it is a source of danger—it is fairly contended that no spread of infection need take place, while without one every infectious case becomes a centre, being without means of effective isolation. The economy of hospitals as a security against epidemics and consequent burdens upon the rates is urged in reply to the ratepayers' objection; while another—that people will not avail themselves of hospital provision—was shown to be ill-founded. Mr. Turner also asked how, in the absence of a hospital, could Section 124 of the same Act be complied with, and dwelt upon some details of hospital construction. In towns a permanent provision of 4 rooms at least was recommended in order to provide for both sexes suffering from two different diseases, and it was maintained that a building should rather exceed than fall short of the average wants of a town. The administrative offices should also exceed the requirements of the permanent wards in case of temporary extension. The author then detailed the memorandum issued by the Local Government Board, one of the conditions of which is that each patient should have, as nearly as practicable, 2,000 cubic feet of ward space, and floor space of not less than 144 square feet. Among other suggestions the paper mentioned the value of the cross-ventilated lobby between ward and closets; open ventilating grates for small wards, and hot-water warming for larger; earth closets, with means of outside removal; intermittent downward filtration for disposal of slops; a heating and disinfecting chamber; the avoidance of all ledges and projecting woodwork, to save dirt; round corners; asphalte or cement floors; the enamel paint of the Liverpool Silicate Paint Company, or a hard-coloured cement for walls, &c. In conclusion, Portland cement concrete was wisely advocated for walls, instead of brick-work, since the former can be done for £9 10s. to £11 per rod, thus effecting a saving of about one-third, as, in the absence of gravel, brickbats, burnt ballast, stone chippings, slate, or flint débris, &c., may be used, while a better artistic effect can be produced on concrete surfaces by rough-cast. In the discussion Dr. Richardson spoke in favour of small temporary hospitals, and in making the walls of zinc or iron, so that they could be cleaned every day. Another paper read in this section had reference to "Medical Practice," by Dr. Ogle, M.A.

In Section III., on "Chemistry and Sanitary Construction," one or two useful papers were contributed. Dr. Angus Smith read a paper on "Air-testing and Analysis," showing that unless we could examine the air, and find out whether it was capable of supporting health, we were far behind. The author said that, in relation to ozone, we knew nothing of its sanitary value. The drift of Dr. Angus's remarks was that our analysis of air failed to detect whether any specific diseases were present, but he thought they would soon be able to predict the death rate from an analysis of the air, which would be a more rational procedure than discovering health from the death rates. Another valuable paper in this section was that on the "Chemistry of Dirt," by Dr. Bartlett, F.C.S. The writer pointed out that dirt comprises a little of solids, liquids, and gases, that the methods we employ to cleanse and purify our dwellings add to the real dirt sometimes, that a great deal passes into the air and is inhaled without being perceived. Strong-flavoured dirt saturates the atmosphere of workshops, but the delicacy of perception of the olfactory and gustatory nerves soon becomes lost to those constantly subjected to noxious smells and vapours. The author justly remarked upon the absence of perception found in malodorous localities, upon the organic and specific matters which impregnate walls and ceilings so as to be capable of reproducing diseases for a considerable period, instancing the air of hospitals, which contain various kinds of suspended matter, as salts of ammonia, carbonate and phosphate of lime, silicate of alumina, chloride of sodium, particles of dried excreta and many kinds of starch corpuscles, and spores of fungi. In the streets we have nitrates, the dairy is subject to the minute particles of dirt, and living and sleeping-rooms to aërial impurities. The author insisted on a minute inspection of walls and ceilings, the avoidance of absorbent paper-hangings with arsenical dust and putrid paste, and pointed to the Dutchman and his wife, who take a delight in cleanliness and paint. Mr. J. Shone, C.E., read a paper on a new "Pneumatic Sewerage System"—a kind of rival to that of Captain Liernur, in which

compressed air was employed to eject the sewage through the outlet, the town being divided into districts. Another paper, on a method of preventing sewer air from entering into houses, by Dr. Heron, was read, which we can only mention.

Friday's proceedings were commenced by an address by Dr. Richardson on "The Constitutional Functions of a Ministry of Health for the United Kingdom," the main gist of which was that the ministry of health lies with the office of the Registrar-General, which office should be changed to that of Minister of Health. It would include, as now, the registration of disease both of animals and plants generally; 2, meteorology; 3, collection and classification of coroners' returns; 4, work carried on by the medical department of Local Board; 5, Adulteration of Food Acts; 6, factory supervision; 7, veterinary supervision; 8, sanitary arrangements of prisons, &c.; and, 9, sanitary control of all public works. We have no further room to devote to the proceedings, but among many papers of interest we may name a valuable contribution by Mr. H. C. Burdett, on "Thames Water;" "The Water Supply of Stafford," by Mr. W. Molyneux, F.G.S.; "Sewage Disposal Nomenclature," by Mr. J. C. Melliss; "Disinfection of Hospital Drains," by W. Seper, M.R.C.S.; "Best Mode of replacing Rookeries and Effete Tenements lately removed in London," by J. Balbirney, M.D.; and "Ozone in Relation to Health," by Dr. Day. To some of these we may refer again when time and space permit.

Though nothing new has been broached, the sectional work at Stafford will compare favourably with any previous congress of the kind.

An interesting and tolerably complete exhibition of sanitary appliances was held in connection with the congress. Messrs. Doulton and Co., of Lambeth, exhibited Field's flushing tank, Stanford's joint, Mansergh's sink trap, and some white sanitary ware, together with a collection of vases and other art pottery in Doulton ware and Lambeth faïence. Messrs. J. and M. Craig, Kilmarnock, exhibited examples of Buchan's patent ventilating drain-trap, to the simplicity and effectiveness of which many times witness has been borne in our own pages. The same firm had also an assortment of slop stones, cleansing stones, and metal gratings for use in connection with the traps. Messrs. James Stiff and Sons, Lambeth, exhibited their "Interceptor" sewer air tap and section, and other similar appliances, water filters, architectural terra cotta, decorated stone ware, &c. Messrs. Potts and Co., Birmingham, showed their patent Edinburgh air-chambered sewer-trap for preventing the entrance of sewer gas into buildings. The Sanitary Appliances Company (Limited), Salford, had on view a working model of their self-acting cinder-sifting ash closet; a portable cinder-sifting ash closet, with soil-pan; and earth closets. Moule's Patent Earth Closet Company (Limited) made a good display of various kinds of sanitary apparatus that have gained a high reputation. Mr. James Woodward, Swadlincote, sent a patent "wash-out" closet and a sample of glazed sewerage pipes. Amongst a large variety of heating apparatus we noticed a convoluted stove sent by Mr. J. Constantine, of Manchester. There were also numerous contrivances for curing smoky chimneys; amongst the exhibitors being Messrs. Ewart and Son, London. Messrs. Colman and Glendenning, Norwich, exhibited a collection of models of school furniture; and Messrs. T. Larmuth and Co., Salford, a number of full-sized articles of a similar class. The "patent safety" gas baths and bath-heaters, shown by Messrs. Ewart and Son, are also worth mention. Of water-purifying apparatus there was an abundant display. The stand of Messrs. F. H. Atkins and Co., London, afforded evidence of a very successful application of charcoal to filtering operations. The Silicate Paint Company, London and Liverpool, had a stand containing samples of their celebrated silicate and enamel paints, petrifying liquid, and Griffiths' patent white for all kinds of decorative work, the cure of damp walls, and preservation of metals, &c. Messrs. Gillow and Co., of London, exhibited an ornamental and cleverly-combined lavatory and dressing-case. The awards of the judges upon the exhibits were made known at this meeting. The judges were Professor Corfield, Dr. Dyke, Dr. Bartlett, Mr. Law, and Mr. Rogers Field. To Major Duncan, R.A., the Director of the Ambulance Department, was awarded a medal of the institute for his exhibit of a wheeled ambulance litter, with a stretcher which is capable of being detached. Three medals were awarded for cooking stoves and heating apparatus. The Silicate Paint Company, of Liverpool, were awarded a medal for exhibits for decorative work, and for the cure of damp walls. A medal was awarded to the Sanitary Appliances Company of Salford for ash closets, &c.; and a medal was also given to Moule's Earth Closet Co. Doulton and Co., of Lambeth, were awarded a medal for a patent joint for stonework pipes.

A CHAPTER ON ROOFS OF THE RENAISSANCE.—I.

THE word *Roof* appears in Bosworth's "Dictionary" of the Anglo-Saxon language, but Shakespeare used the current spelling, and King Lear exclaims, "No! rather I abjure all roofs" (ii., 4). In that general way more than the mere covering of a house was meant, but the technical significance is narrower. The carpenter applies the term "roof" to the framework that supports the covering, and the nature of that superficies has more influence on the pitch or angle of the slope than any other consideration. While the outer surface was formed of thatch or shingles the pitch was steep, and the roof constituted a considerable part of the edifice. But towards the end of the 15th century lead in sheets of moderate thickness was used in important works. A great change was thus made practicable in the figure of the roof—as a very small inclination would serve for protection against rain and snow. Buildings designed at that time and subsequently, had comparatively low or flat roofs, as seen in the Royal chapels at Cambridge, Windsor, and Eton. But the eye and the mind had been so long accustomed to the fuller proportions of Early roofs that those proportions were retained, when on occasions of repair lead was substituted for less substantial materials. Westminster Abbey is a good example of this determination to preserve the old lines. The church is groined with stone throughout the interior, and no part of the wooden roof is seen from within; therefore, it was a pure act of deference to artistic perceptions. At St. Alban's Abbey—now converted into a cathedral—on the other hand, more utilitarian sentiments prevailed. The roof is not seen within, being shut off by the ancient flat ceiling of painted wood, and the pitch of the lead roof is low. The consequence is a loss of mass, and a discontinuance of line that are unquestionably defective in the way of composition. This is so palpable that a design for a new cathedral, presenting such a fault, would infallibly be at once condemned. There is another view with many advocates who plead the sanctity of time for work that several centuries have made, if not holy, at least historical, and entitled by prescriptive possession to maintain its place. The diversity has given rise to a well-sustained discussion, but it is not likely to be permanently lamented, that art is great, and has prevailed.

Where tiles form the covering the pitch is from one-third to one-half of the span, and for slates the rise is usually one-fourth.

It may be presumed that in Italy the practice of ancient times would come traditionally down, and there is in the Romanesque Church of San Miniato (Fig. 1), at Florence, an example of great interest. The church has some resemblance in plan to that of St. Peter, at Northampton. The nave is crossed at intervals by stone gables, and at smaller distances between those gables are principals of wood of moderately low pitch. There is little apparent difference from the modern roof, but on examination it will be found as completely on the insistent principle as that of St. Bartholomew's Hospital, Sandwich, referred to in "British Carpentry," and must have been constructed long before the art of trussing was thought of. It is presented here as an authentic specimen of its class, revealed to us by the labours of Mr. Gally Knight, and as a well-defined point of departure. The chief beam is bolstered at the ends for more effective junction with the walls, and deepened in the middle, where the strain is greatest. Far from any attempt to disguise them, the augmentations are carefully articulated and expressed with the emphasis of decoration. The beam was to serve as a bearer, and was fortified accordingly. The inclined rafters, carrying the purlins and outer covering, though uniformly loaded, would be most tried in the middle, and a raking strut is placed there for relief.

Dean Aldrich quotes a statement of Ware, that he who showed how to execute a roof with the smallest quantity of timber, would spare the walls a needless weight, and the owner a needless expense. The solution must consist in giving timber its most powerful direction—that is, lengthwise against compression and extension, and the provision of supporting members where cross-strains cannot be avoided. In this, indeed, the great principle of trussing consists. The progress has been slow, and the commencement due to the general movement in science, already alluded to, is probably more recent than sometimes supposed.

If the San Miniato roof were treated on this method, the chief timber would be changed from a bearer to a tie, and greatly reduced. The inclined rafters would keep it in a state of tension by their connection with it at their feet, and if they were simply abutted at the apex, the three pieces would form a simple "principal," of which the inclined beams would be compressed, and the level beam extended. But in each case the force would be exerted lengthwise only. If the tie-beam were required to support a ceiling it would itself need a suspender from the apex of the rafters, and thus the weight of the ceiling would be borne by them, and transmitted to the walls. The timbers so bound by opposing forces would constitute a "truss," and exemplify a treatment totally distinct from that of ancient usage.

Previous to its destruction by fire, July 16, 1823, the basilica of St. Paul's at Rome, contained perhaps the earliest example of a roof depending upon the walls for vertical support alone (Fig. 2), and yet throwing no weight upon the main beam, but on the contrary giving to it a series of bearings—a very masterpiece of skill and masculine simplicity. The span is 78ft., and all the timbers are in duplicate, except the king-post, but the admirable means by which they are connected will be most readily explained by the diagram. But for the early date it would seem very probable that Bernardo Rossellini was the inventor. He restored the church, and was much employed by Pope Nicholas V., who died in 1455. Tredgold has a good illustration, and observes that it was executed about 400 years ago. Le Tarouilly gives a section of the cross-wave or transeptal position, executed under Sixtus V., towards 1587. A new façade was constructed so late as 1725, by Antonio Carnevari, under Benedict XIII., and the character of the truss would better accord

with these later dates. In the restored roof, cross-pieces, like bases, are shown at the feet of the king and queen posts, but the introduction is unfortunate, and quite at variance with the suspensory object originally so well expressed.

San Lorenzo fuori le Mura—a basilica also restored by Rossellini — has principal rafters and straining-beam, but neither queen, king, nor any kind of suspender. The frame is, therefore, mechanically a simple arch raised upon the tie-beam, very much in the way English builders of the 15th century would have followed. Omitting certain minor parts, the example at Crowhurst-place, Kent, in the BUILDING NEWS of eight years since, and "British Carpentry," 1871, may be referred to.

The basilica of Sta. Maria Maggiore, though of less width, has a roof with double principals and wooden king-post, like St. Paul's. It has also a panelled ceiling, as at the eastern part of that church. The principal façade and interior are the work of Ferdinando Fuga, A.D. 1743, in the pontificate of Benedict XIV. This roof can hardly, therefore, be of earlier date.

It would be singular, indeed, that if so remarkable an example as that of St. Paul's had been for a century open to observation, that Palladio should close the first book of his grand volumes with this sentence—"There are many ways of framing the timber of the roofs, but when the middle walls bear the girders they are easily laid on, and 'tis what I do much approve, because the out-walls are less pressed, and if any end of the girder should happen to rot, the roof would not be so much in danger of falling." The roofs of this great architect fall obviously short of the standard seen above. The Italian artists seem, indeed, to have concerned themselves little about the precise economy of wood, and the use of suspenders was slowly adopted. There is, consequently, less occasion for wonder that our distinguished countryman, Inigo Jones, should, in matters of carpentry, disappoint the expectations built upon an observant student, combining in himself the qualifications of artist and craftsman. Jones had fully reached the zenith of his powers at the date (1631) of St. Paul's, Covent-garden, and the roof of that church may be taken as a criterion of his method (see Fig. 3). Intended as a chapel of ease to St. Martin's-in-the-Fields, it was designed and built in a manner worthy of its present attributes as the first Protestant church of importance known to exist, and an example of so eminent a master. The roof is engraved in the "Carpenter and Joiners' Assistant," by Peter Nicholson, 1797, from a measured drawing made at the time of the repairs, in 1795—the year in which it was burnt. Nicholson himself measured the roof that replaced it in 1796—"Mr. Hardwick, architect, Mr. Wapshott, carpenter." The clear width of the church is 50ft., but the great projection of the eaves makes the length of the tie-beam 72ft. Looking at the principal as an open rib 18ft. deep, it ought to be very powerful; but it is evident that Jones used much timber with no great efficiency or regard to suspensory and tensile principles. In Mr. Hardwick's design the frame is simplified, and the purpose of each member made more obvious and direct. The trusses are 10ft. 6in. apart, and the tie-beam is cambered 6in., which appears excessive, although due regard be paid to shrinkage

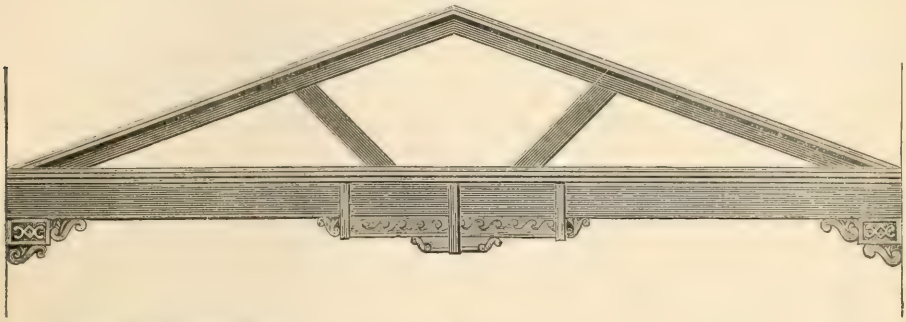


Fig. 1.

Fig. 2.

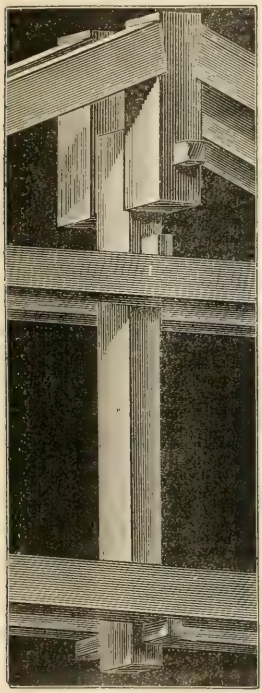


Fig. 3.

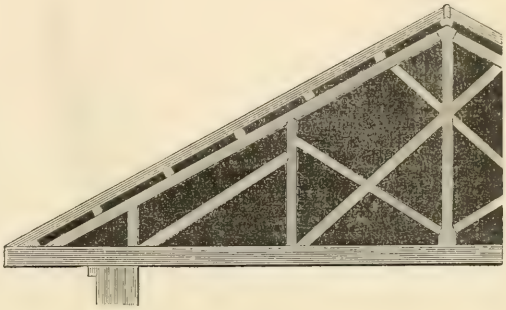
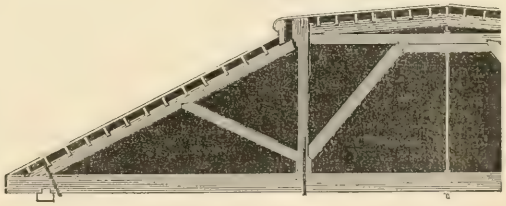


Fig. 4.



and settlement. Carpenters are accustomed to make this beam concave at the rate of about half an inch in 10ft., in order that, for optical considerations, the ceiling may follow the curvature; but it produces a gratuitous strain upon the truss and the walls, while the visual effect could be produced by preferable means. The original roof is reproduced, and the double table of scantlings will show the greater economy of the substituted design.

COMPARATIVE TABLE OF SCANTLINGS.

	Jones.	Hardwick.
Tie-beam	16×12 ...	16 ×12
King and queens ...	12×12 ...	8½ × 8½
Struts between queens	12× 8 ...	— —
Straining beam ...	— — ...	10 × 8
Principal rafter ...	10×10 ...	10 × 8½
Lowest ditto	12× 8 ...	10 × 8½
Struts from queens ...	— — ...	10 × 7
Purlins	12×10 ...	9 × 6½
Common rafters ...	— — ...	6 × 3½
Wall plate	— — ...	12 ×10
Contents of a complete truss	273ft.	198ft.

The chapel at Greenwich Hospital was so much injured by fire in 1779 as to make rebuilding necessary, James Stuart, of Athenian memory, being at the time surveyor. The roof (Fig. 4) was constructed about 1785 by Samuel Wyatt. It has a clear span of 51ft., and a rise of one-fourth, except that the top is flat for about a third of the width. It has queen posts and struts, and in the centre an iron bolt. Its excellence, as a model, is shown by repetition in various places, and among them, if my memory serves, St. Pancras Church.

OUR COMMONPLACE COLUMN.

CRUCIFIX

Is the representation of our Saviour hanging upon the cross. In the early ages of Christianity it was never represented. "We do not think," says M. V.-le-Duc, "that there exists a single painted or sculptured representation of the crucifix before the 6th century, and dating from this period until the 12th century these images are very rare." "In the primitive times," says M. Didron, "the cross is seen, but without the divine crucified one. Towards the 6th century a crucifix executed at Narbonne is spoken of, but this is an extraordinary instance, and hence is noted on account of its rarity. In the 10th century some crucifixes appear here and there, but the crucified is manifested with a gentle and benevolent countenance." We have culled the above extract from M. Viollet-le-Duc, who, describing a celebrated crucifix of the 12th century in Cluny Museum, says: "His head does not indicate physical suffering, but rather benevolence; his eyes are open, his hair is not disordered, and it does not appear that a crown of thorns has been placed upon his head. The primitive crucifixes, like those of Saint Sernin and Amiens, have the head covered with a royal crown. In the 12th century Jesus on the cross has usually his head bare, and it is only from the 13th century that the crown of thorns is seen to encircle his forehead—inclined towards the ground. Crucifixes placed upon the rood-loft are generally accompanied with the Virgin and St. John. The Virgin is placed on the right of the Saviour and St. John on the left. Sometimes an angel at the foot of the cross receives Christ's blood in a chalice. . . . Generally Christ crucified is nimbed with a cruciform nimbus. This divine sign, however, is omitted in many of the paintings and bas-reliefs of the 13th and 14th centuries. Towards the end of the 13th century Christ is distorted and dejected; the arms are no longer at right-angles with the body; the head is imprinted with an expression of physical suffering, forced even occasionally to exaggeration. The tendency towards realism is still most apparent during the 14th century, and artists begin in the 15th century to give to the crucified form all the appearances of human nature subjected to the most frightful punishment. The question is to replace in the spirit of the faithful the sentiment of the triumph of divinity upon the cross by the sentiment of pity."—("Dict. Raisonnée de l'Archit.") During the middle ages our Saviour's head droops with an expression of pain and grief. At the Renaissance, however, when literature once more revives, we find the expression joyful and sublime, as though conscious of having redeemed the whole world. [We also refer the reader to Lecky's "History of Rationalism" for a philosophical review of middle-age art.]

CRYPT.

"C. F. W." sends the following notes on this subject:—Crypt (Lat. *crypta* = Gr. κρύπτη, a covered place, vault, from κρύπτειν to hide) is a term generally used, although not exclusively, in ecclesiastical architecture. With the Romans it had three distinct significations: "(1), A covered portico, *crypto-porticus—i.e.*, with the sides walled up; (2), a grotto with the meaning of our present word tunnel, a vault used for any secret worship; (3), the tomb in which a number of corpses were buried" (Dr. Smith's "Dict. Antiq."). It is with this last meaning that the word is familiar to us. Crypts undoubtedly originated from the catacombs which were used by the early Christians, both as places of assembly and as burial places. M. V.-le-Duc, in his "Dict. Rais.," says:—"The earliest crypts or sacred grottoes have been constructed in rock or masonry under the ground, to hide from the eyes of the profane the tombs of martyrs; later on above those *hypogea*, venerated by the early Christians, who erected them in chapels and large churches. Crypts were built under the edifice devoted to worship, and in them were placed holy corpses collected by the faithful. Many of our ancient churches possess crypts that date back to a very remote period; some are merely squared arched rooms, with a barrel or crossed vaulting, following the ancient method, and ornamented with only fragments of columns and capitals rudely imitated from Roman architecture. Others are really subterranean churches, with aisles, apses, and side apses. The churches of France," continues our author, "present a great variety as to the disposition of the plan of crypts. Several are built with much splendour, adorned with paintings, marble columns, and embellished capitals, and are large enough to contain a great many of the faithful. The crypts invariably possess two staircases, so as to allow the numerous pilgrims, who come to invoke the aid of the saints whose remains have been placed in the vaults, to descend in procession by one flight of steps and to ascend by the other. By this means disorder and confusion were evaded. In a great number of crypts there are wells the water of which is considered miraculous." "The Handbk. of Eng. Ecclesiology" states that "there are not many of these underground chapels in England; they generally afford excellent specimens of groining. Canterbury Cathedral is perhaps the largest; there are good examples at St. Mary Lacstingham, Yorkshire; Holy Trinity, Bosham, Sussex; Bristol, St. John Baptist; Oxford, St. Peter in the East; St. Leonard, Hythe, Kent; St. Mary, Standon, Herts. The usual appurtenances of an altar may here also be looked for." To the above we may add the crypt of Winchester Cathedral, built by Bishop Walkelyn, 1079. The arches are plain, semicircular; roof of aisles has plain groining; rude cushioned caps, with chamfered and channelled abaci; it terminates with an apse. Ripon Cathedral has a small one, with small cells. In one of the party-walls there is a hole termed a needle, through which ladies often pass for luck; this is called threading the needle. These cells are generally described as having been a confessional. Similar to this is the crypt at Hexham. At Rothwell, Northants, is a crypt, converted, it is supposed, two centuries ago into an ossuary. Prof. Parker suggests that the hole was for the exhibition of the relics of saints; this is corroborated by Dean Stanley, in his "Mem. of Canterbury," p. 226, where he describes the procession of pilgrims. The crypt of York Minster contains some Saxon and Norman work. Chester and Gloucester Cathedrals have Norman crypts. The above will be sufficient to show that the chief crypts belong to the Romanesque period, and many to the Norman style. M. de Caumont remarks:—"Large Romanesque churches were often built over crypts. Subterranean chapels were built as long as the round arch style of architecture predominated; in general, after the adoption of Gothic architecture, their construction was discontinued. One could scarcely mention any example of crypts after the 12th century."

DADO OR DIE,

In architecture, is that part of the pedestal of a column between the plinth and cornice and capping. In *Decoration* the dado is applied to the corresponding portion of the wall, or that above the plinth and below the surbase moulding. A dado should be generally of a darker colour or shade of tone than the wall proper, and, if decorated, should be treated in a more massive manner than the wall above. Bleck-like forms, diapers of conventional treatment somewhat different to that of the wall hanging, should be adopted. In the Stuart period the dado was made an important feature in room decoration; dadoes were occasionally richly panelled in oak, or otherwise ornamented. We refer our readers to the BUILDING NEWS Club Designs for the treatment of the dado, and to other of the numerous examples of internal decoration we have given.

DAIRY.

In the building of a dairy the following points should be attended to:—A northern exposure is preferable, and the dairy should be well removed from all offensive smells, pigsties, and water-closets. The walls should be hollow, lined with white glazed tiles. Good ventilation, and a high roof with north windows, are necessary. Stone or slate shelves are the best, 2½ft. wide, supported on iron rods from the brick floor. The floor should be paved, and, if possible, partly sunk in the ground, and should have a fall to a drain. A double door is advisable, and the interior temperature should be preserved at about 50° to 56°. To insure this, air apertures, with sliding shutters, are desirable, and the windows should have blinds to keep out the heat. A large dairy should have a milk-room, churning-room, scullery, and cheese-room attached. Small dairies are usually placed on the north side of a kitchen court. (See Morton's "Cyclopædia of Agriculture," and Loudon's "Encyclopædia of Cottage and Farm Architecture.")

"J. A." sends the following:—A dairy should be situated on a dry spot, somewhat elevated, and on porous soil. Coolness in summer, and an equable temperature in winter, are essential requisites in a dairy. The cow-house or milking-house should be as near the dairy as possible—if practicable, under the same roof. The dairy-house should consist of three distinct apartments below, with lofts and cheese chambers above. The principal place is the dairy properly so called, sunk 2ft. or 3ft. below the level of the ground, with a stone or brick bench or table round three sides of it to hold the milk pans. Air holes, with sliding shutters, should be provided in the walls. The floor should be of stone or paving tiles, sloping gently towards a drain to carry off the water. The windows should be latticed or made like Venetian blinds. The next important place, the wash-house, should have a chimney, and a large copper kettle hanging on a crane. Between these two last apartments may be another communicating with both, and forming a kind of vestibule, where the churning may take place, and over them a cheese-room. Sometimes the bench round the dairy is formed of wood covered with lead, circular places cut out to hold the milk, and a strainer at the bottom. The milk can be drawn off through the bottom of these bowls, leaving the cream behind. In Holland the dairy is a building about 60ft. long by 30ft. wide, with a verandah running round three sides of it. The dairy room is sunk below the level of soil and paved with brick, the sides covered with Dutch tiles, and the arched roof with hard cement. Dairy farms in England are principally in Gloucester, Devonshire, and Cheshire.

DALMATIC.

Dalmatica, the deacon's robe in the Roman Catholic Church. The earliest form appears to have been a plain gown of linen, extending below the knees, with loose sleeves. It is now made of a heavy silk, like the planeta, which was introduced by the late Mr. Pugin. The most ancient form of Dalmatic is seen in a painting on the walls of the Roman catacombs.

DAMASKEENING.

"Damaskeening" or "damascening" is an ancient art, introduced by the Crusaders from Damascus, and consists of covering the surface of fine steel with ornamental designs formed by dark lines on a light ground, or *vice versâ*, and sometimes inlays of gold. The Damascus blades were of steel and iron welded together, the designs being brought out by acids, which, eating away unequally, produced the effect. Imitations are produced on steel by etching with acids. Gun barrels are often ornamented in this manner.

DAMP COURSE.

The damp course should be placed from 3 to 6in. above the outer level of ground, and the plates or timbers of basement floors should be placed upon it. Damp courses are also desirable in chimney stacks, towers, &c., that rise above the roof, especially those exposed to the wet. The last use is, however, seldom considered. The kinds of impermeable layers used are various—pitch and powdered charcoal, asphalte and sand, and coal-tar laid on while in a boiling state, slate set in cement, lead, and stoneware slabs. The best kind of damp-proof course is that made of stoneware perforated for ventilation of floors, and known as the "Broomhall damp-proof course." These are manufactured in slabs of all widths, and can be inserted as a course wherever desirable. For internal partition and sleeper walls they promote a through current of air below the joists, and thus insure dryness and ventilation at the same time.

DECORATED STYLE.

This style has been assigned various periods of duration. Britton fixes it from A.D. 1272 to 1461; Rickman from 1307 to 1377. In general, however, the style so distinguished may be said to have lasted during the reigns of the first three Edwards, or from the latter part of the 13th till nearly the close of the 14th century. In France and Germany this perfection of Gothic detail was reached earlier than in England. Mr. Sharpe, in his new nomenclature, calls this style the "Curvilinear," or from 1315 to 1360; it followed the Geometrical. It must be remembered, however, there is no line of separation between the styles or arbitrary subdivision in the Gothic. All that we understand by the term Decorated is that the Gothic attained a higher development and richness in its forms than it did in the Early English, and perhaps the term "Middle Pointed" is more correct and expressive. It is worthy of remark also that this complete development of the style occurred simultaneously with the culmination of the religious, social, and political life of the nation, and with the most perfect specimen of English poetry—that of Chaucer's "Canterbury Tales"—which may be regarded as representative of the central period of poetry or that between the Early English and Elizabethan character and peculiarities. Tracery in the decorated style is florid; the equilateral and obtuse pointed arches are common, and the lines of tracery vary from geometrical to curvilinear forms. The capitals are full of foliage, but without the stiffness of the preceding style. The mouldings consist usually of rounds and hollows, separated by fillets; the hollows are often enriched by foliage and the ball flower. Foliage generally displays greater freedom, and the natural types are more closely imitated. Examples: Among the best examples of the style we may mention Howden, Yorkshire; York Cathedral, the nave and presbytery; Norwich, cathedral vaulting, cloisters, St. Ethelbert's gate; parts of Hereford; Gloucester cathedral, especially the south aisle; nave of Exeter; Merton Chapel, Oxford; St. Mary's tower and spire at Oxford; choir of Bristol Cathedral; Chapter House, Wells; tombs of Queen Eleanor and Queen Philippa, Westminster, &c.

DESIGN.

Design is the general conception of the artist in outline or colour, and should chiefly show the composition of the work as a whole without reference to detail. Utility and fitness are the essentials of all good design, and imply a consideration of the properties and functions of materials, their strength, weight, &c., and the purposes and uses for which the work is intended. Besides these the artist has to consider the æsthetic—the beauty or harmony arising from the proper and discriminate adaptation of means to ends, the proportions between the parts, expression, or the qualities and attributes of different forms of lines, contrast, gradation, and colour. We refer the reader, who is desirous of studying the subject philosophically the following works:—Alison on "Taste," section on the "Sublimity and Beauty of the Material World," chap. iv.; Burke's "Essay on the Beautiful," Dugald Stewart's "Philosophical Works," Hogarth's "Analysis of Beauty." The modern treatises which should be studied upon the subject are, "Treatise on Design," G. E. L. Garbett (Lockwood and Co.); "Chapter on Design," in Wightwick's "Hints to Young Architects," Guillaume's edition; Fergusson's "Principles of Beauty," Professor Bain, in his work on the "Senses and Intellect," &c. The subject has also been discussed in the earlier volumes of the BUILDING NEWS. *Design of a Building.*—This should comprise the general plan, elevations, and sections. In designing a building a general sketch is usually made of the plan and external composition, after which the plan is worked out with greater detail to scale, and the elevations designed in conformity therewith. The preferable course is to study the perspective of the chief façades simultaneously with the plan and construction—in fact, in good design, the arrangement of apartments, the general combination of the parts, the roofing, &c., should be considered together as a general scheme or sketch before the detail drawings are prepared. A harmonious whole can only be the result of a co-ordinated conception and study. For the general principles adopted in designing buildings we refer the student to Gwilt's "Encyclopædia" and other elementary treatises. Perspective is of the utmost importance in conceiving a building—the theory of the projection of shadows should be clearly understood also. The best preparation for architectural design is undoubtedly an analytical study of the classic orders and good models.

DINING-ROOM.

A dining-room should be long in proportion to its width. A pleasing proportion is when the sides are about 2 to 3, though a double square is sometimes used. A room 24 by 18, or 18 by 14, is a good ordinary size. In planning a dining-room care must be taken to place the door at one end of the longest side, so as to give plenty of space for sideboard, though this is sometimes better placed at the end of the room. In small rooms a recessed sideboard is desirable. The windows may be placed at the end or along one side. In decoration the walls should be treated of a darker and more massive tone than the other reception-rooms, and perhaps a dark dado of grey or cinnamon, with a lighter shade for the wall over, is the most pleasing. Simply-painted walls are the best, and the decoration should be sparingly introduced, and should consist of panels, diapers, &c., with a frieze, in which may be introduced emblematic devices or bric-à-brac. There should be two doorways in a large dining-room, one for the use of visitors and the other for the servants' use. A service hatch may be substituted for the latter, with a serving lobby. A dining-room should be uear the kitchen.

DISTEMPER.

A mode of painting in which the colours are mixed with whiting, size, and water, instead of oil. Ceilings and walls are sometimes distempered.

DOLMEN.

See Cromlech.

THE ELECTRIC LIGHT IN SHOW-ROOMS.

MESSRS. WELLS AND COMPANY, of the Commercial Ironworks, Shoreditch, have fitted up the electric light on Jablochkoff's system at their showrooms, and the great beauty of the light is thus exhibited under circumstances well calculated to favourably impress the observer. The machine employed is the Gramme—the distributor being capable of dividing the current, and supplying six lamps, or, as they are in this case called, "candles." The Jablochkoff candle consists of two small rods of gas carbon, separated by a thin and narrow plate of kaolin or plaster of Paris. The current passes alternately from one pole to the other, and in so doing heats the carbon and the kaolin to incandescence, producing the well-known electric arc—in this case a point of light of great brilliancy, but not of the intensity obtained with the older forms of electric lamps. The object of the new invention is to divide the current and furnish a number of light centres instead of one overpoweringly-brilliant focus, and so far the result is all that could be desired. A Jablochkoff candle is said to be equal to 100 gas-lights in illuminating power—a statement that must, however, be accepted with reserve; but, whatever the photometric value may be, it is seriously reduced by the necessity for using opaline globes to diffuse the light. The effect is excellent. The colours of the marble mantelpieces exhibited in the showrooms are as clearly distinguishable as by daylight, as are also the tints of the numerous specimens of artificial marble, and the shades of the iron and brass work. The light radiating from the surface of the opaline globes is soft and agreeable, and, unlike that from gas, it is pure and white. For this reason the electric lamp is well adapted for use in picture galleries and museums, and all places where it is desired to appreciate the effect of colour at a time when artificial light is necessary. Recent experiences in Paris with the Jablochkoff candle, and in London with the Loutin apparatus, show that the electric light is well adapted for lighting up streets and large open spaces, but whether it is more economical than gas is a point at present unsettled. There are many instances, however, where cost will be a secondary condition, and the purity and brilliancy of the electric lamp will be preferred to the yellow and impure light of coal-gas.

VOTING PAPERS AT THE INSTITUTE.

THE following letter has been sent by Professor Kerr to the secretary of the R.I.B.A., and will doubtless receive consideration at the hands of the council. The suggestion is certainly worth discussion:—

[*Copy.*]

22, Old Burlington-street, W., Oct. 8, 1878.

DEAR SIR,—I think it has been pretty well understood for many years that the non-metropolitan fellows of the Royal Institute of British Architects have felt dissatisfied with the small share—or no share at all—which they have been allowed to possess in the practical working of the guild.

Now that under the new organisation such members have ceased to be half-price contributors, this grievance obviously becomes more substantial. It has no doubt occurred to many of us that there certainly is one simple way whereby to confer upon provincial members in some degree a better position—namely, by merely removing a sort of disqualification which happens to be imposed upon them quite unintentionally. That is to say, instead of leaving the control of affairs entirely in the hands of those members who can attend personally to vote at the rooms, why not let the principle be introduced of arriving at the opinion of the members at large (upon questions of sufficient moment) by the use of voting papers? This is, at the least, a mode of procedure for which there are nowadays a thousand precedents.

I should feel much obliged if you would ascertain for me whether there is any particular way in which, in the opinion of the council, it would be most convenient to have this question brought forward for discussion at an early period in the coming session.—I remain, dear sir, yours very truly,

ROBERT KERR.

To W. H. White, Esq., Sec. R.I.B.A.

Memorial stones of a new Wesleyan chapel and schoolrooms were laid at Killinghall, near Ripon, on the 25th ult. The building will be Gothic in character, and is being erected from the designs of Mr. W. Croft, of Killinghall. The cost will be £1,200, independent of that for the stone, which is given by friends.

The erection of the library and picture gallery connected with the Shakespeare memorial theatre at Stratford-on-Avon was commenced last week. Messrs. Dodgson and Unsworth are the architects, and Mr. W. H. Lascelles the contractor. We illustrated the designs a few years since.

The Liverpool Town Council resolved last week to carry out a scheme of street improvements at an estimated cost of £218,000.

The School Board for Ore, Sussex, on Friday last selected Messrs. Jeffrey and Skinner, of Hastings, as architects for the proposed new schools.

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ILLUSTRATIONS.

NEW NATURAL HISTORY MUSEUM, SOUTH KENSINGTON—HOUSE AT BROADWATER DOWN, TUNBRIDGE WELLS—LODGE AT BRAMFIELD HALL, SUFFOLK—THIRD PREMIATED DESIGN FOR YARMOUTH TOWN HALL.

OUR LITHOGRAPHIC ILLUSTRATIONS.

GREAT YARMOUTH MUNICIPAL BUILDINGS.

The design illustrated this week was submitted under the motto "Bona Fides," by Mr. Brightwen Binyon, of Ipswich, and was awarded the third premium. It will be seen that the ground floor is cut up into three main sections by two unbroken corridors running east and west. The section facing north is again divided by the main entrance; the central section by the main staircase and internal area; and the southern section by one of the secondary entrances. This method of dividing the plan into certain distinct sections keeps the departments to a large extent separate from each other, and is found to provide for them approximately the amount of accommodation required, with the exception of gentlemen's cloak-room, to which special reference will be made. The main entrance is through the clock tower in the centre of the north front. Passing through a groined vestibule (on one side of which is the porter's box, and on the other the ladies' cloak-room), the visitor would find himself in a spacious hall, with the principal staircase rising in front of him, through the central arch of a triple arcade. He would gain access to the town clerk's or accountant's departments by the corridor to the right of him, and to the surveyor's department by the corridor to the left. On the occasion of public assemblies, the ladies, after parting with their cloaks at the entrance, would ascend the flight of stairs immediately opposite them; the gentlemen, having passed through the room for hats and coats, could either rise by the flight of stairs opposite to and corresponding with that facing the main entrance, or join the ladies in the entrance hall by the side corridor. Five subsidiary entrances are placed on the three remaining sides of the building. The southern entrance on the east side would be exclusively used by those having business in the courts, who would thus have no contact whatever with the public coming to the courts as spectators, or those visiting the building for other business purposes. The style of the building may be described as Jacobean, shorn of its extravagances. Under different circumstances the author would have adopted Gothic forms, but these latter, it appeared to him, would have been in this case in too violent a contrast with all the surroundings. The cost of carrying out the design, exclusive of heating apparatus, decoration, clock and bells, was estimated at £23,650, but should the tenders have exceeded this amount a considerable reduction might have been made by lessening the amount of stonework in the exterior walls.

HOUSE, BROADWATER DOWN.

Continuing our series of illustrations from the drawings in this year's Royal Academy Exhibition, we give a view of a house erected at Broadwater Down, Tunbridge Wells, from the designs of Mr. W. Young, of Exeter Hall. The house is situated on a most picturesque site, and is built of red brick, half timber, and weather tiles. The building, together with oak chimney pieces, and other internal decorative works—designed by the architect in harmony with the style of the building—has been carried out in a very satisfactory manner by Mr. G. Mansfield, of Tunbridge Wells.

NATIONAL HISTORY MUSEUM, SOUTH KENSINGTON.

Our illustrations this week give a bay complete of the side of the Index Museum or Entrance Hall of this building. The arch on the ground floor opens into a square recess for the exhibition of specimens in wall cases. Above is the gallery, which leads from one staircase to another. This gallery is lighted on the one side by large windows, and on the other opens out through the arcade, which we illustrate, into the centre of the hall below. On the left of the elevation of this bay is seen the soffit of the staircase leading from the first to the second floor, and a portion of the arcades which surround this staircase. The whole of the walls of this part of the building are lined with terra cotta, like that of the exterior, in two colours, the major part of its natural buff colour, and the parts shaded a blueish grey. On the smaller sheet we give the terra-cotta casings of the stanchions, which support the floors of the south galleries. These casings, to the height of 10ft. from the floor in some galleries, and of 12ft. in others, are perfectly square, the ornament on them being of the slightest possible projection. They are so treated in order to allow the exhibition cases to be fitted between them and the side walls. Above, where they are clear of the cases, they assume a sort of H section to a certain extent, following the shape of the stanchion within, and are more richly decorated. The space between the terra cotta and the iron is filled in with fine cement concrete, so as to render the casing impervious to either fire or water.

ENTRANCE LODGE, BRAMFIELD HALL, SUFFOLK.

The boundary walls and stone piers were erected as shown by our view last year, and the entrance lodge, of which we also give a plan, is about to be built next the principal entrance to the grounds of Bramfield Hall, from the same architects' designs, Messrs. W. Pells and Son, surveyors, of Beccles, Suffolk. The materials for the walling will be local-made red kiln bricks, with plain tiles for the roof, which will have an ornamental cresting and finials, as shown.

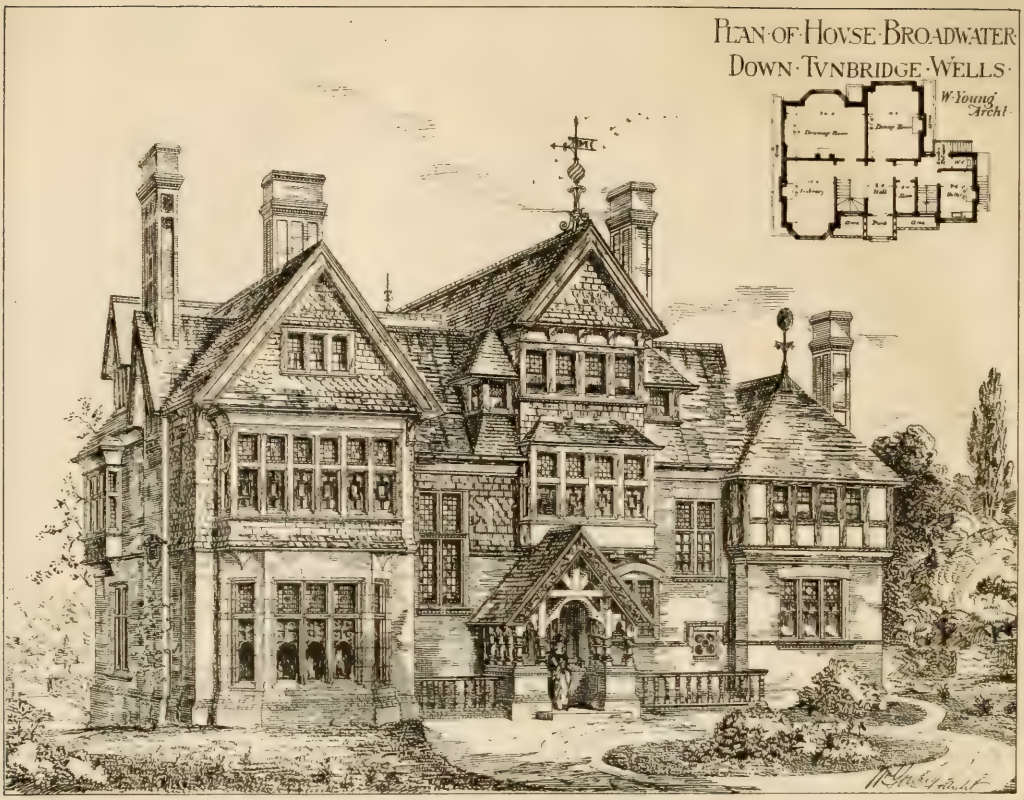
COMPETITIONS.

Nottingham.—We are informed that thirteen sets of drawings have been received in competition for the "Class Room School," to be erected by the School Board for Nottingham on the Hunger Hill-road site, where provision for 1,020 children is to be made. As may be supposed, some of the designs are very straggling, while one or two bear evidence of experienced planning, and at any rate possess the merit of compactness. Two more schools remain to be competed for—viz., those to be erected in Bulwell Coventry-road and Bulwell Quarry-road, the former for 620, the latter for 400 children.

ARCHÆOLOGICAL.

A Roman Villa at Thorparch.—A paper by Mr. John Emmett, of Boston Spa, on "A Roman Villa near Thorparch," was read on Tuesday evening before the Leeds Naturalists' Club. There was a large attendance of members, and Mr. H. Pocklington, F.R.M.S., occupied the chair. The site of the villa, which is of large area, is at Dalton Parlours. The foundations of several rooms have been discovered, but the most important discovery was that of a splendid tile pavement, now in the possession of the Yorkshire Philosophical Society. It is semicircular in form, and consists of the head of a Gorgon or Medusa, surrounded by a very elaborate design. Other interesting remains have been found, and were described in the paper, which was very full and complete, and was illustrated with diagrams, plans, and specimens of the remains, tesseræ, coins, &c. At the conclusion, Mr. John Holmes made some interesting observations, stating that the villa had evidently belonged to a Roman of high rank. Mr. William Howgate pointed out that the design of the pavement, though Roman work, was of a Greek type of art.

British Barrows in North Wilts.—The investigation of the barrows in the parish of Aldbourne, Wilts, by the Rev. Canon Greenwell, F.R.S., and Mr. Walter Money, F.S.A., of Newbury, has been continued during the past week. The three remaining ones of the group of four have been examined with the following results:—The barrow on the south of that previously described contained the interment of an unburnt body in a grave in the centre, 6ft. long by 4ft. wide, and sunk to a depth of 3ft. into the chalk rock. With this body were found a very beautifully made and perfect knife-dagger 3⅝in. long, and a barbed arrow-head of flint. The adjoining barrow to the south of the last produced a single interment of a burnt body in an oval grave at the centre, excavated 2ft. deep, into the chalk rock. Among the bones was found a bone pin, with a large perforation at the head, also burnt. In the mound were several pieces of decorated pottery, many flakes and chippings of flint, a saw and scraper of the same material, a piece of the edge of a ground flint axe, and another portion out of the middle of a greenstone axe. The last barrow had been opened by a former explorer, during the course of whose operations an unburnt body had been discovered. The original interment, that of the burnt bones of a woman, was found in an oblong grave 2½ft. long, excavated in the chalk rock at the centre of the mound. A barrow situated about 200 yards on the slope of the hill to the west of the principal group proved to be of more than ordinary interest. The outer part of the mound was formed of earth and rubble chalk, and within was a cairn of sarsen stones, 20ft. in diameter and 5ft. high. Underneath this at the centre, and laid upon the natural surface, was a deposit of burnt bones, the remains probably of two women. At the south side of the deposit had been placed an incense cup, very beautifully made and richly ornamented, but so much decayed and broken as to render its restoration doubtful. Close adjoining this was a very small and thin bronze knife, and two prickers or awls of the same material. These articles were too much corroded by oxidation to enable their size and exact shape to be determined. In close proximity was a conical button, ⅝in. in diameter, of inferior jet or lignite, and a ring, 1⅜in. in diameter, and a circular pendant ornament of the same substance, but of a better quality, ⅝in. in diameter, having a perforated projection, and seven beads, three of whitish-coloured glass, two of amber, one of jet, and one of some indeterminate material. On the north side, and beyond the deposit of burnt bones, but still within the enclosing wood, was a second incense cup, 3½in. in width and 2in. high, of general form and of the same size as the first, but not so well made or ornamented. Scattered here and there among the materials of the mound were fragments of pottery, numerous flakes and chippings of flint, and two arrow points, one barbed, the other triangular-shaped; bones of ox and pig, all split, probably for the purpose of extracting the marrow, were met with in the barrow. The last barrow examined, placed about a mile to the north-west of the chief group upon the slope of the hill on the opposite side of the valley, was still 7ft. high, and contained a single burial at the centre. This consisted of the burnt bones of apparently a man, placed in the middle of an oval grave, sunk 2ft. into the chalk; the bones had been encased on all sides in wood. On the top of them was laid a knife-dagger of bronze, 3¾in. long. It has two rivet holes to fix it to the handle, and, as no metal rivets are seen, it is probable it was attached by wooden pegs. As in all the former barrows, numerous chippings of flint, pieces of pottery, and animal bones were dispersed throughout the mound, together with three flint scrapers. These barrows were chiefly of the beautiful bell-shaped form, so remarkable a feature in the numerous barrows around Stonehenge; and the presence in them of a considerable amount of bronze, together with glass, amber, and jet, points to a higher condition in the ancient inhabitants of North Wilts than has been usually attributed to them.



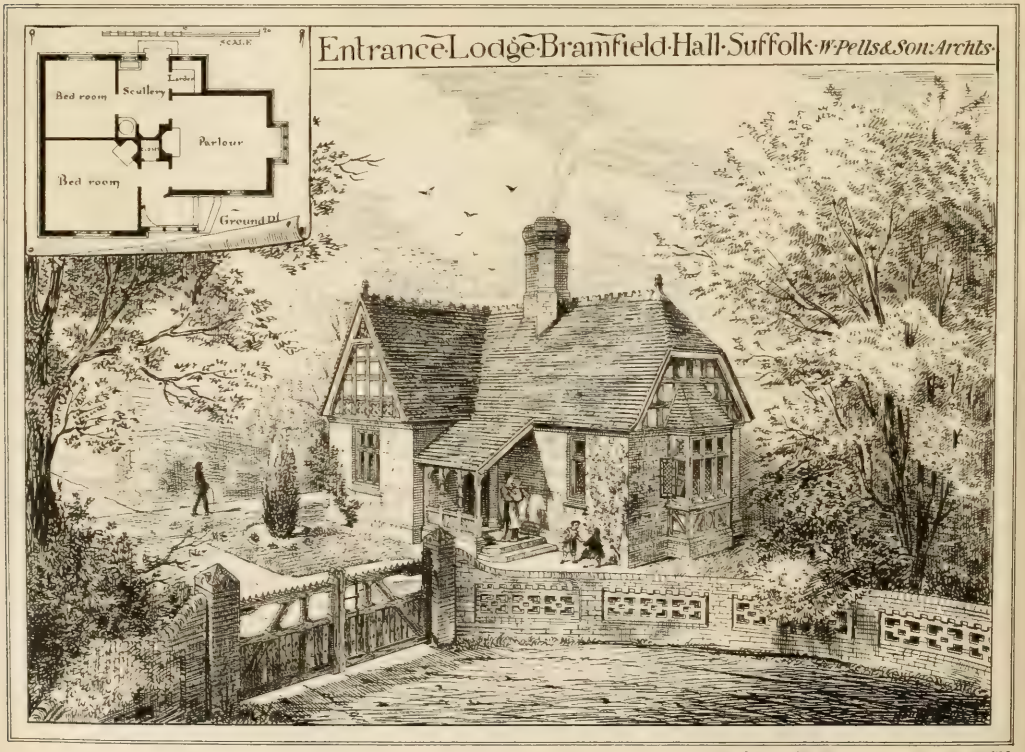
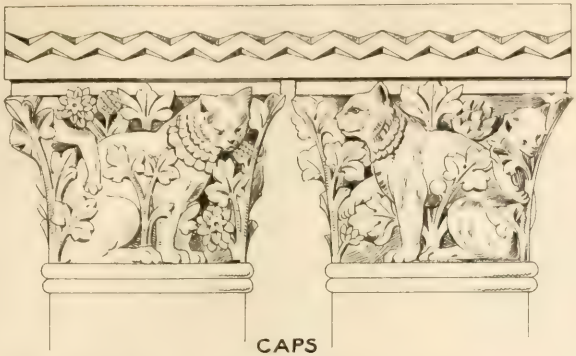


Photo Lithographed & Printed by James Akerman, 6, Queen Square, W.C.

NEW NATURAL HISTORY MUSEUM KENSINGTON

A. Waterhouse A.R.A. ARCHITECT



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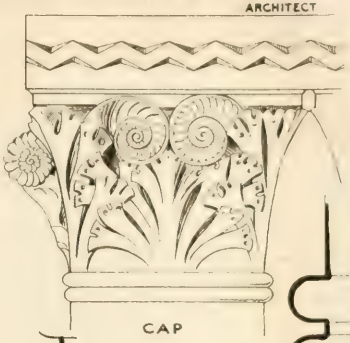

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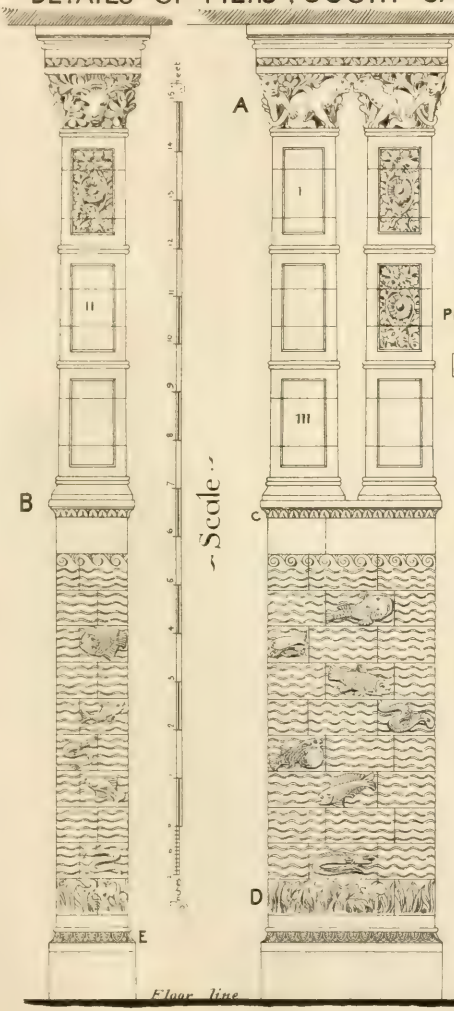
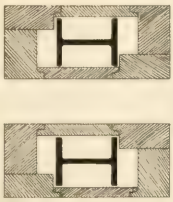
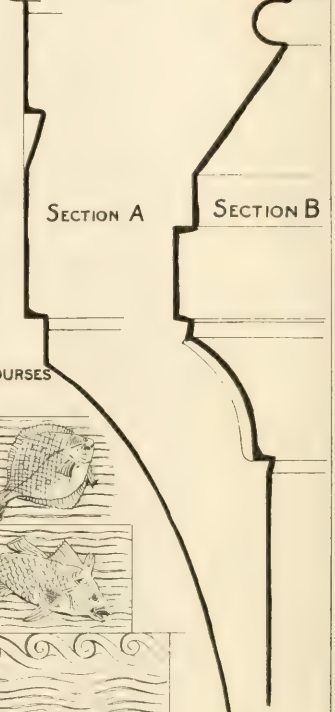
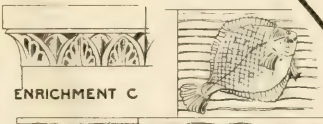
DETAILS OF PIERS, SOUTH GALLERIES



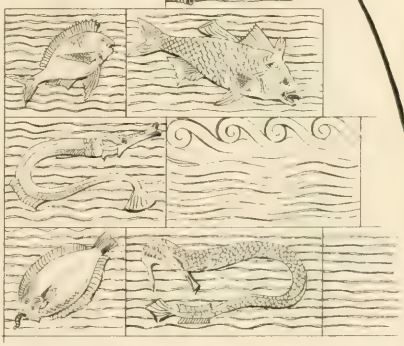


PLAN OF ALTERNATING COURSES



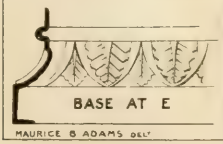


ENRICHMENT C



CREST & FISH STONES

PANELS I II &c



BASE AT E

ENRICHMENT AT D

MAURICE B. ADAMS DEL.

Photo-Lithographed & Printed by James Akerman 6 Queen Square W.C.

THE TURNERS' COMPANY EXHIBITION.

THE Turners' Company, like other City guilds, have for some time been promoting technical arts and handicrafts. In 1854 the first exhibition of a competitive character was held, the subjects for competition being a couple of fishing-rods. This year—the 9th annual exhibition—we have a display of some pretensions, comprising works in wood-turning, pottery, diamond-cutting, &c. We cannot say that the wood exhibition is either so large or of so high an order as we could have desired, but the workmanship is certainly of a better quality than we have seen on previous occasions. In the class of pottery, although there are some very praiseworthy attempts, the exhibits hardly come up to the standard, and for this reason, probably, the first and second prizes of class A, for thrown and not tool-touched exhibits, have not been awarded. In class B there is a larger and very fair collection, but in class C the work is scarcely up to the usual mark. Beginning with the wood turning, we notice the first prize silver medal and the freedom of the company is awarded to J. M. Honeychurch, of York-street, Baker-street, for a pair of inlaid vases, executed in light and dark-coloured woods—Amboyna, laburnum, sycamore, ebony, and ivory. The outline and design are chaste, the darker woods being pleasingly introduced. The base of each vase is supported by six ebony feet. The value set upon this pair is £21. We notice a railing with motto, "Try," to which the fourth prize has been awarded, by J. Thwaites, of Hastings; the design is weak, and too much effort is apparent. A pair of well-proportioned vases of pitch pine, relieved by ebony (No. 10), shows a pleasing outline, the novelty being chiefly obtained in the handles and bases of ebony, which are turned, and the work is a clever adaptation of turned wood. The artist is J. E. Norris, of City-road, to whom the third prize and first certificate of merit are awarded. Another pair of vases (No. 20), by Stephen Davis, lack outline. We note also some carved oval frames, exceedingly clever, and exhibiting careful workmanship. They were composed of small pieces of deal cut to a shape and framed together. The hand-turning in a few ornaments and pateras is clever, though wanting in design. These win the seventh prize, and are by Frank H. Carle, aged eighteen years, of Marylebone, an apprentice of Mr. W. Cumley, who won the first prize and the freedom of the City in 1876. No. 11 (sixth prize) are cup vases, in ebony, but wanting in proportion and bases; the artist's name being J. Hegley, of Hoxton. We notice some well-turned balusters, which received the eleventh prize (No. 19), by Andre Lalandre. The clock-stand executed in dark rosewood, which receives the tenth prize, by W. Ripley Whitby, betrays the same want of study of design—it is overdone. We notice also a pair of lustres, in turned wood, with pendents executed in dark and light-coloured woods; and a pair of vases in ebony, with light wood rings in neck and base, are simple. The other prizes are awarded to J. Batterbee, of Euston-road; J. Coulson, Thirsk; F. W. Hubble, Plumstead; A. Foster, Goswell-road; and G. Filman. Pottery is represented by some clever productions, but the quality of design is not so conspicuous as we should like to see. No first and second prizes are awarded. The third prize, with a first certificate, is given to Henry Bryon, of Clapham, for a large vase "thrown," but without any tool design on the surface; the fourth prize is awarded to Alfred Dupuis, Lambeth, for a similar class of pottery. The same artist also wins the third prize in Class C, for pottery thrown and turned. The fifth prize is given to J. B. Lewis, of Lambeth, who also wins a prize for pottery thrown and turned. The first prize (silver medal) in the latter class is given to Charles Birk, of Stoke-on-Trent, In the Class C, turned and shaved, the prizes are awarded to Higinbotham, Longton, Staffordshire; M. Watson, Torquay; T. Parks, Torquay; Martin, of Vauxhall; W. Higginbottom, Torquay. Some of these vases—as Nos. 2 and 10—display much merit. In Class C we note "Devonia" and "W. B." for good outline. The large Doulton vase "Perseverance" lacks base and execution. The first prize for diamond work is awarded to J. D. Snock, of Hatton-garden; the second to W. Lack, of Gray's-inn-road. Three other prizes are awarded in this class. The exhibits have been rather hurriedly brought together, and without so fitting a background as the occasion required.

EXAMPLES OF STEAM, AIR, AND GAS ENGINES.*

FEW authors on practical engineering have enjoyed greater popularity than Mr. Bourne. We remember his "Treatise on the Steam Engine" as one of the earliest and best guides, and his "Catechism" is equally well known. The work now before us appears to be supplementary to those treatises, and furnishes examples of the most recent types of machinery employed in mines, factories, steam navigation, railways, &c. From the preface we learn that this work was begun in 1868, and was issued in monthly parts till 1870, when the publication was suspended to enable the author to complete a series of experiments to determine in what way coal dust could be best utilised in the generation of motive power. These researches have proved rather disappointing, and have shown that the use of powdered fuel was not so advantageous as was expected, but that refuse coal as it comes from the mine could be burnt with equal if not superior calorific effect, and with greater facility.

Of thermo-dynamic motors Mr. Bourne says the steam-engine is still the most important, the gas-engines by Lenoir, Hugon, Otto, and others, being used only for minor purposes. It is said, too, and may be important to those about to choose a motor, that the cost of a gas engine without a boiler is about as much as a steam-engine with one, while the steam-engine has the advantage of being more equable and less noisy in action. Every one knows that the steam-engine is a wasteful machine, and that not more than one-tenth of the power due to the heat is obtained. The labours of Joule and others have produced a well-founded conviction of the faults of the steam-engine as a motor, and Mr. Bourne was one of the first to show its defects. One of the chief sources of loss of power is owing to the comparative low temperature of water in the boiler. The author sketches the attempts made to overcome this defect by superheating the steam, but this plan has its evils. It is found that very hot steam burns the packings and carbonises the oil, that the internal corrosion of boilers was often due to the contact of the hot metal with the steam, while as to the economy of the system the author believes it to have been exaggerated, and to be due more to the utilisation of the waste heat which before ascended the chimney. Since 1832, says Mr. Bourne, the progress of steam-engine improvement has been quite insignificant. It is substantially as Watt left it. The minor improvements have been largely due to Mr. Bourne himself, and that gentleman's experience has gone hand in hand with actual improvements. Among these we may just note the introduction of liquid for solid fuel, in which the author had a share—at least, the substitution of the riveting machine for hand hammers and link motion. As regards liquid fuel—a mixture of coal-tar and water for the furnaces—the author affirms that the water does not contribute to the calorific effect; he also contends that the doctrine of smoke burning is unsound, and that the right principle is to *hinder* its formation—a principle that has been promulgated also by Mr. Chas. Wye Williams, and upon which there seems to be a little disagreement as to priority of idea. We can only mention, in addition, Bourne's tubular marine boiler and expansion valve, introduced in 1838, with many other improvements patented in the same year.

Space will permit us only to glance here in a very general way at the voluminous contents of Mr. Bourne's work. The evaporative power of liquid fuel, such as gas-tar, is entered into fully, and several arrangements of boiler furnaces are illustrated. Various types of land and marine boilers occupy a large part of the work; pumping engines are shown upon a large scale; blowing, mill, and marine engines are discussed; air and gas engines are noticed, beginning from Dr. Allen's, in 1729, to that of Josiah and Caleb Pratt in 1868. One of the most interesting chapters of the book, occupying over 100 pages, is Chapter II., on "Selected projects for producing motive power." We note, for example, steam blasts or jets for propelling air and fluids; Eastwood's duplex boiler furnaces, where there is an upper and lower furnace—the fire of the former reposing upon tubes containing water, between which the flame descends on its way to the flue, while the lower fire rests upon ordinary furnace bars; Tredgold and McNeil's down-draught furnace; Bourne's coal-dust furnace, differently applied; Perkins' arrangements for maintaining circulation in boilers; Danford's superheated steam generator; Giffard's boiler for very high pressure; Kirkham's carbonic oxide furnace; Tooth's ditto; Brown's gas vacuum engine; Wright's gas exploding engine; Lenoir's gas, Ericsson's caloric, and Stirling's air engine; Mackintosh's steam and air jet; Robertson's arrangements; besides many others. Into the details and merits of these various systems the author enters in a masterly manner. He first shows what conditions constitute efficient motive power—viz., the transformation of heat into its equivalent energy; and, second, the transformation of this energy into a beneficial kind of power. The aim of the descriptions critically written is to show how far these conditions have been fulfilled. In Chapter III. the author compares steam, air, and gas-engines, and arrives at the conclusion that air or gas-engines are not likely to supersede steam for sustained work; but that engines worked by hot air or by explosion of gas being without boiler, do not require the constant attendance to make sure of the water level; and, consequently, for small powers, are more convenient. Such engines are, however, larger, more complex, and costly than steam-engines. Examples of compound marine engines form an important section of the work before us. The proportions of engines of this class, with many valuable particulars of some of the best construction, as supplied by Napier and Sons, Penn and Son, Bourne and Co., Maudslay, Sons, and Field, J. G. Thomson, J. Ericsson, and others, are furnished, and there are in all upwards of 50 admirable and well-executed steel plates, containing plans, elevations, sections, and details to working scales, of many of the finest marine, land, and other engines. Not the least valuable part of the work before us is the appendix, which contains numerous details of practical interest to the engineer. Thus we have some information on steam without smoke, the evaporative power of coal, and boiler explosions, illustrating the reports of disasters of this kind, the types of boiler, and the appearance of the boilers after explosion. Some of these are very instructive, as exhibiting the modes of failure of Cornish and other forms of boiler. Various instances of kitchen boilers are given in which bursting has taken place owing to the pipes being stopped by frost and the want of safety valves. Parts 21 to 26 are now supplied, completing Mr. Bourne's work, and these describe the experiments with coal-dust furnaces, are accompanied by working drawings, and bring down improvements in furnaces, boilers, and other details, torpedo vessels, &c., to the latest period. Lists of works on the strength of material and practical engineering, specifications for compound screw marine engines, and a copious index are given in these parts. We recommend to all engineers Mr. Bourne's comprehensive and thoroughly practical work of examples. The conclusions of the author are that all steam-engines, whether high or low pressure, should be constructed on the high-speed principle, with counterweights to balance the momentum of the parts, and that all engines should be worked expansively, and have steam jackets. An impending improvement in steam navigation is hinted at—namely, the introduction of automatic means in stoking the furnaces. We hope with these improvements something will also be done to show that engineering details need not be at variance with æsthetics.

* Examples of Steam, Air, and Gas Engines of the Most Recent Approved Types," &c. By JOHN BOURNE, C.E. London: Longman, Green, and Co.

Building Intelligence.

Belfast.—Sandy-row Presbyterian Church, Lisburn-road, Belast, has just had a new front added, consisting of two flanking towers broken up with buttresses and projecting string courses. The towers are 14ft. by 12ft. at the base, rise to an altitude of nearly 60ft., and are arranged to give access to the galleries by means of staircases. Between the towers is a narthex, from which are the principal entrances to the body of the church. The narthex is approached by a flight of six stone steps; the floor is laid with encaustic tiles of various colours; the walls are finished in grey, with alabaster mouldings, and the ceiling is of pitch-pine, stained and varnished. The work has been carried out by Messrs. Rodgers and Craig, builders, of Whiteabbey, from the designs of Mr. James F. Mackinnon, C.E., Belfast.

Edinburgh.—During the past twelve months there has been in process of building a new Free church at Mayfield. The ground plan is cruciform, with a segmental apse at the east end of the nave. Both transepts are double, and are deeply recessed, while the nave has an aisle on either side. The nave is 88ft. in length by 42ft. wide, including the aisles, each of the transepts receding about 18ft. Externally the front towards St. Andrew's-terrace presents a gable termination, flanked by projecting buttresses which terminate, atop, in circular pinnacles. The church will be seated to accommodate upwards of 700 persons. The buildings have been carried out from designs furnished by Mr. Hippolyte J. Blanc, the style adopted throughout being Early Gothic of French type.

Lincoln.—The new county hospital was opened on Tuesday, the 1st inst. The building, as at present construsted, provides accommodation for about 110 patients. A description and illustration appeared in the Building News, June 30, 1876. The external walls are built hollow. The roofs are covered with permanent green slates. The stone for the dressings is Ancaster. The plans were prepared by Mr. Alexander Graham, of Carlton Chambers, Regent-street, London. The contractors for the work were Messrs. Barnes and Wright, builders, of Lincoln. Mr. G. Bacon was clerk of works.

London.—The Church of St. Augustine and St. Faith, situated at the corner of Watling-street and Old Change, and which, according to tradition, was rebuilt after the the great fire from designs furnished by a daughter of Sir Christopher Wren, has just been put into a state of thorough repair, and at the same time has been re-arranged and decorated under the superintendence and from the plans of Mr. A. W. Blomfield. The south and west galleries have been completely removed, and the pulpit too has been removed to a better position. Another great improvement, independent of mere decorative effect, has been achieved by the substitution in the roof of tasteful lights of what is technically called cathedral glass, for some singularly ineffective, not to say ugly, expanses of what, whilst it pretended to be quarry glass, was in fact nothing but the commonest glass charged with a stencilled pattern in a dirty brown colour. This change alone has made the church at least twice as light and cheerful as it was before. The decorations proper have been carefully designed so as to harmonise with the style of the building. The roof is treated principally with greyish blue, white, and gold; the walls with sage green, relieved by bands of other colours, charged with festoons of fruit, flowers, &c. This part of the work culminates in the reredos, which has been thoroughly cleaned, restored, and judiciously coloured, whilst upon its panels have been painted a picture of the Ascension, flanked by figures of St. Augustine and St. Faith. All the windows of the church, formerly obstructed by unsightly double sashes, have been opened out and filled with glass similar to that used in the roof, whilst a mosaic pavement of good design has been laid in the sacrarium. The decorations, glass, and paintings have been designed and executed by Messrs. Campbell and Smith; the builder's work by Mr. Walden; the mosaic pavement by Messrs. Simpson and Co. The church was opened last evening.

London School Board.—On Wednesday the board accepted the following tenders:—For the erection of a school for 1,200 children in Summerford-street, Bethnal-green, that of Mr. T. Boyce, of Eagle Works, Hackney (£11,990); for enlarging Sydenham-hill-road school by 80 girls' places, Messrs. R. Lonergan and Sons, of Elington-road, Plumstead (£725); enlarging Knapp-road school, Bromley-by-Bow, by 400 places, Mr. S. J. Jerrard, of Loampit-vale, Lewisham (£2,048); for tar-paving the playgrounds of board schools, at 2s. 3d. per square yard—the paving to be kept in repair for one year from the date of completion—and also for "running" the tar-paving at the expiration of the first year, at 3d. per square yard, and for keeping it in repair for a subsequent period of two years, Messrs. R. and G. Neal, Wandsworth-common; Messrs. A. C. W. Hobman and Co., Clifton-road, Peckham; Messrs. Wright and Charlton, 17, Queen Victoria-street, E.C.

Lostwithiel.—The parish church of St. Bartholomew, Lostwithiel, is now under restoration. Plans for this work were made some years ago by Mr. Joseph Clark, F.S.A. The contract for considerable alterations has been let to Messrs. Phelp and Brown, builders, of Lostwithiel. The tower and spire are of early type, much earlier than most of the ecclesiastical work found in Cornwall. Within the church, and at the west end, is one of those curious old fonts for which the county is famous—rude and quaint, interesting for its antiquity and the vigorous artistic power its design and execution display. It is octagonal, and stands upon five shafts. Upon the cants of the bowl are the sculptured figures of a priest, ape, huntsman, lion, and other odd things. This font, the church spire, the old zigzag-buttressed 14th century town bridge across the Fowey, the antique Stannary Court built by the ancient Earls of Cornwall, and hard by the beautiful and romantic ruins of Restormel Castle, built in the first Edward's reign, are the great points of interest to the architectural student and the archæologist that Lostwithiel has to boast. Besides the restoration of the spire, and the renovation of the exterior of the building where required, the interior has been entirely stripped of the pews. The plaster ceiling has also been cleared away, and the walls relieved of their coats of compo. The present works embrace the erection of a timbered roof in pitch-pine, new floors, and restoration generally. The carved work is being carried out by Mr. Harry Hems, Exeter.

Metropolitan Board of Works.—At this board, on Friday, in reference to the request of a deputation, it was decided to hold a conference in committee with the gas and water committee of the Corporation of London on the subject of the use of the hydrants now being laid down in the City for the extinction of fires. The widening of the railway bridges carrying Golburne-road and Ladbroke-grove-road having been completed, a cheque for £6,154 11s. 7d. was ordered to be drawn in favour of the Great Western Railway Company. A report was received from the engineer and consulting chemist of the board relative to the preservation of the surface of Cleopatra's Needle, in which it was stated that the same was in a rotten condition, and liable to become disintegrated by the action of the London atmosphere, and still more so by frosts. The works committee recommended that a trial be made of the "stone solution" for that purpose. It was alleged by members that this compound had been used without success on the Houses of Parliament, and the matter was referred back to the works committee, who were instructed to obtain the components of the stone solution, and to make inquiries as to its results at Westminster Palace and elsewhere. It was referred to the engineer to report what measures can be taken to protect the ornamental railings round the gardens on the Victoria and Albert Embankments, it being complained that these railings, which were cast to special pattern at a considerable expense, were continually being damaged by the knocking off of prominent details. It having been reported that the contract with Messrs. Mowlem and Burt for the general works in district B was about to expire, invitations were directed to be issued for fresh tenders and schedules for one, two, or three years. With reference to the application of Mr. C. Fowler, district surveyor, for appointment of fees for special services in superintending the fixing of iron ties through the party walls of Nos. 40 and 42, St. John's-road, Hexton, and Nos. 75 and 77, Worship-street, the Building Act Committee report that the district surveyor was under no obligation to render the special services in question, and that the board therefore cannot fix special fees for such services.

Newhall.—On Monday Mr. Mundella, M.P., laid the corner stone of a new Primitive Methodist chapel here. The plans have been prepared by Mr. Kerridge, Wisbech, and the contracts have been let to Mr. George Curtis, of Sheffield. The chapel will be in what might be termed the elliptic Gothic style of architecture, and will be of red brick, with stone dressings. In the interior it will be 34ft. by 56ft., and the height will be 25ft. The body of the chapel will seat 250 people, and there will be galleries all around capable of sitting 200 more people. At the back will be an orchestra and four vestries. The entire cost will be about £1,300.

Notting-hill.—The new Carmelite Convent, St. Charles-square, Notting-hill, was opened on Michaelmas Day. The style throughout is Early Geometrical, and the buildings are faced externally with stock bricks, relieved by bands of blue Staffordshire and white pressed bricks. The chapel, placed on the first-floor, is lined internally with red and black bricks, and is entered from the outer or public courtyard by a covered stone staircase. It is 74ft. in length by 24ft. in width, and 38ft. from floor line to the apex of the roof, which is open-timbered. It is capable of accommodating about 150 to 200 worshippers. There is a Lady chapel opposite to the grating of the nuns' choir. The architect is Mr. F. H. Pownall, of Montague-square.

Southport.—Memorial stones of a new Wesleyan chapel in Leyland-road, Manchester-road, were laid on the 25th ult. The plan comprises nave, transepts, and chancel, and the designs show a building of a plain 13th century Gothic character, with little use of elaborate mouldings or tracery. The approach to the nave is through a tower to the right, and a porch to the left, both connected by screens with central vestibule. Galleries are provided in the transepts and over entrance, the nave being clear and in one span. On either side of chancel are vestries, and in rear is a band-room seating 100 persons. At the chief angle is a tower with spire, to be carried to a height of 150ft. The windows will be glazed with dead lights, having coloured margins; the large rose window at end of chancel being enriched with geometric figures in various tints. The architects are Messrs. Wm. Waddington and Son, of Burnley, and the contractors Messrs. Bridge and Son, of Southport. The estimated cost is £10,000.

Whittlebury.—The parish church of Whittlebury was reopened on the 4th inst., after restoration under the care of Mr. J. P. St. Aubyn. The church consists of a nave, with north and south aisles and a chancel, to which a new organ-chamber and vestry have been added at the north side. The old embattled tower remains intact at the west end. The nave has an open roof of oak rising to a considerable height. The joinery throughout is of oak. Behind the altar an alabaster and marble reredos, sculptured by Mr. Earp, has been placed. The work was at first undertaken by Messrs. Young, contractors and builders, Lincoln, but was soon afterwards taken out of their hands. The work was immediately continued by local workmen. The interior work was put into the hands of Messrs. Pattenham and Fotheringham, London. The entire works were superintended throughout by Mr. Vaughan, clerk of the works.

Works of sewerage have been carried out at Orton, near Appleby, from the designs of Mr. Watson, C.E., surveyor to the East Ward rural sanitary authority. The work has been executed by contract by Mr. Jas. Bland, of Appleby.

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TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.]

All letters should be addressed to the EDITOR, 31, TAVISTOCK-STREET, COVENT-GARDEN, W.C.

To Our Readers.—We shall feel obliged to any of our readers who will favour us with brief notes of works contemplated or in progress in the provinces.

Cheques and Post-office Orders to be made payable to J. Passmore Edwards.

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Advertisements for the current week must reach the office not later than 5 p.m. on Thursday.

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Cases for binding the half-yearly volumes, 2s. each.

Received.—H. B. Co.—J. W. and Co.—G. W. G.—B. L. Co.—J. C. and Co.—E. F. P.—W. C.—R. D. and Co.—A. A.—J. H.

Drawings Received.—H. O. and Sons.—W. H. L.—R. B. M.—S. and Son.—Cross in a Circle.—G. H. G.

X. (The side streets of the Strand, and round about the Adelphi, would be the most likely locality, but we know of no special boarding houses of the description you indicate.)—Enquirer. (We understand you now; but would the information be worth the space it would occupy? We hardly think so. Besides, although we never spare such eccentricities ourselves, there would be something invidious in the appearance of comments on them by anonymous correspondents, which would for the most part be the reverse of complimentary.)—J. N. H. (The examinations are advertised from time to time in the daily papers, and all information can be obtained at the India Office.)

"Building News" Designing Club.—P. Lauder. (If mullions are used they should be in brick.)—John Smith. (One sheet only must be sent. Cubical contents should be taken from bottom of footings.)—Draughtsman. (In reply to query 2, we do not bind each competitor to one design monthly, nor do we limit the series to twelve months.)—Alf. Carden, Brighton. (We could not in justice extend the time now we have noted your name.)

Correspondence.

OAK AND CHESTNUT TIMBER.

To the Editor of the Building News.

Sir,—The upper woodcut at page 315 is inverted; and as a correction of my own escaped notice Mr. Blashill's remarks are the more useful, though parts of his letter are open to exception. The identity of logs that may be cut across and divided longitudinally has never, I should think, excited much concern or difficulty. One cannot, with regard to them, well misunderstand or discredit the convincing nature of the tests proposed. The means of discrimination are of chief interest where objects of venerable age, or embodiments of art, are involved. Go, for instance, into some such place as the post-room at Lambeth Palace, where crossing girders have for centuries been borne by a central upright, and say to which class the wood belongs, assuming no silver grain to be visible. Could the Primate, or any other owner, be held perverse for declining to have those relics cut and divided? Surely not, and therefore Mr. Blashill's predication is untenable. In such, and they are the most important cases, we are thrown upon colour, rate of growth, and those minor characteristics that are said to be "quite sufficient for the guidance of the practical man." This affords an opening for individuality, and opposite, yet peremptory, conclusions are drawn from the same data, yielding an unceasing harvest of controversy to be ever and anon "thrashed out."—I am, &c.,

Thomas Morris.

LEEK FEVER HOSPITAL.

Sir,—Mr. Taylor, from the tenour of his letter in your issue of the 27th ult., seems to imply that I had an interest in a set of designs in the competition for the above.

I beg most emphatically to deny the imputation, and apologise for asking you to insert in your paper matter of only individual concern, and therefore uninteresting to your readers generally, but justice to my character called for a reply.—I am, &c.,

Leek, Oct. 8, 1878. J. W. Critchlow.

The parish church of Market Deeping, which had been closed 18 months for restoration and enlargement, was reopened on the 26th ult. The church has been re-seated throughout, and floored with tiles by Minton and Co. The restoration has been under the superintendence of Mr. James Fowler, of Louth.

A monument erected about 40 years since on Tor Alvie, Kinrara, N.B., to the memory of the last Duke of Gordon, is being repaired by a "Steeple Jack" from Dundee.

The Croydon Local Board have determined to let their sewage irrigation farm at Beddington to Mr. Parrott, their manager, at a rent of £2,000 a year. The average annual loss on the farm since 1874 when the Sewage Farm Company failed, has been £2,871, and the estimated loss under the new arrangement is £2,505, including the additional rent of £752 about to be charged by the owner.

A Local Government Board inquiry was held at Burton-on-Trent on Wednesday week, before Mr. Arnold Taylor, respecting an application by the town improvement commissioners for sanction to borrow £20,000 for gas extension works. The application will probably be granted.

It has been decided to establish science and art classes in Blackpool. The teachers selected for the art class by the committee is Mr. J. Roberts, of the Warrington School of Art.

The workmen in the employ of Mr. Davis, builder of Taunton, who have been employed at Calmhead, the seat of Mr. Mellor, Q.C., were entertained at dinner on Thursday in celebration of the completion of the works.

Two massive towers have been erected for the Government at Taunton by Mr. Trevenna, contractor, as part of the new barracks scheme. At the present time tenders are invited for the main building, the estimated cost of which is estimated at about £40,000.

An archæological excursion was made from Bristol, on Tuesday week, to the mediæval manor-house of Lyte's Carey, and the churches of Somerton, Charlton Mackrell, Charlton Adam, Kingsdon, and Long Sutton. Mr. Reynolds described the architecture of the various buildings visited, and in the evening a dinner was held at Langport under the presidency of Bishop Clifford.

At the recent quarterly meeting of the Bath and Wells Diocesan Societies the following grants were made:—Rebuilding Radstock Church, £120; restoring Holford Church, £25; repairing of Middle Chinnock Church, £50; building mission-room at Blaydon, in Pitminster parish, £15; restoring Churchill Church, £50.

For breaking into a sewer at Perry-hill without first obtaining the consent of the Lewisham District Board of Works, Mr. Nightingale, contractor, has been fined £1 and costs.

New Board Schools have just been erected for the Sutton-in-Ashfield School Board, from the designs of Mr. Dodsley, architect to the board. Mr. Hibbert was the contractor.

The Local Board of Newton, South Devon, on Friday raised the salary of their surveyor, Mr. Stevens, by £20 a year.

At Burnham, Somerset, the memorial stones of a new Wesleyan chapel, to cost £1,300, have been laid. The style is Decorated Gothic, and 280 sittings will be provided. Mr. A. Lauder, of Barnstaple, is the architect.

The Town Council of Blackburn decided at their last meeting to close no fewer than 40 houses, situated in Union-buildings, Penny, Blakey, Moor, and Brunswick streets, and Snigbrook, as unfit for human habitation.

The Sunday-school accommodation at the West Croydon Baptist chapel is about to be increased by the erection of class-rooms, at an estimated cost of £1,200. The plans are given by the architect, Mr. Morton Glover.

Intercommunication.

QUESTIONS.

[5540.]—**Arbitration.**—In the Building News, Vol. XXVIII., p. 589, the following extract from the *Law Times* occurs:—"The Court of Exchequer Chamber has reserved judgment in a case which raises once more the question whether an agreement to refer future differences arising out of a contract to arbitration, so as to oust the jurisdiction of the courts, is void, as being opposed to public policy." I shall feel obliged by any reader giving me the substance of the judgment in a few words.—Anon.

[5541.]—**Flanching.**—What is meant by a chimney-pot flanched round with tiles?—Anon.

[5542.]—**Judging Materials.**—If some kind subscriber will kindly inform me on the following I shall feel most grateful:—1. How to judge the quality of white lead—also oils and turps? Specification describes above to be the best of its kind, but without sending samples to a chemist I am myself unable to form an opinion by merely looking at it. 2. To judge the quality of best 21oz. British sheet glass—also seconds 21oz.—the general thickness or gauge, and if both descriptions should not be free from stars or dots, and straight on surface? And on section what colour should it appear?—East Londoner.

[5543.]—**Staining and Varnishing.**—What is good work worth per yard that has been carefully and cleanly twice sized, stopped with hard stopping, stained in two shades of colour, with the return edges of door stiles, &c., cut in where there are no mouldings—which, of course, also necessitates carefully cutting in each colour—and varnished with 2 coats of best copal varnish, and carefully rubbed down between the coats, to leave the work with a smooth face and high gloss? We think such work ought to be charged day-work; but where that is not allowed we wish to know what it ought to be considered worth per yard for ordinary woodwork in a gentleman's house?—C. S. S. L.

[5544.]—**Gauging Flow of Small Streams.**—Will some correspondent kindly inform me of a simple mode of gauging the quantity of water flowing in small streams, &c.?—Water-gauge.

[5545.]—**Bakers' Ovens.**—I shall be glad if any one will kindly give some information as to the construction of ordinary brick-built bakers' ovens for coal or wood, mode of building furnace and flues, position of chimney, size of same, thickness of sides, and top of oven. Will ordinary kiln bricks do for the inside and the bottom of the oven, and should they be set in mortar, or the whole built in cement? Also please give form of oven, and proportionate inside dimensions.—E. A. B.

REPLIES.

[5461.]—**Stamped Agreements.**—See the Stamp Act, 1870. The matter is so clearly defined that there can be no doubt as to the intentions of the Legislature, which must be taken as expressed in the words of the Act, and not according to the views of business men or lovers of justice, &c. The general custom of the profession is, like many other professional ideas, very difficult to eradicate. I followed the custom of stamping till recently, but was practically enlightened in the law courts. Your readers are welcome to profit by my experience. The matter has been ruled as I state scores of times in the law courts, and frequently recorded in your columns. The true test of the value of an agreement or its mode of execution does not lie in its accordance with professional convenience or dictates of common sense, but as to how it will stand when brought into court. As building contracts are not usually drawn up by legal men, they are held in the utmost contempt by the long robe, bar or bench, and treated accordingly. Many of your correspondents quite miss the point at issue, apparently assuming that a certain mode of stamping, being used with "general satisfaction" in most cases, it is good for all occasions, the fact being that practically very few are tested at law. "Lover of Justice" thinks that the intention of the law is merely to identify any document as part of an agreement. This may be the common-sense view of a practical legal requirement, but does not go far enough. The object of the law is to bring as many fish into the net as can be caught, and if contract deeds and papers are so framed as to require by strict letter of law an absurd number of stamps such stamps must be affixed. The Act here limits the aggregate to 10s.; so it clearly contemplates the possibilty of requiring at least 20 stamps.—B.

[5488.]—**Strength of Woodposts.**—The formula, $7{\cdot}81\frac{D^4}{L^2}$, adopted by Hodgkinson, was suggested by Euler, the great mathematician, but who had no practical knowledge of engineering. Hodgkinson was evidently so impressed with the reputation of Euler that he ignored his own experiments in adopting the formula. It is believed that there are no experiments which will justify Euler's theory that the strength of a woodpost decreases as the square of its length, and Hodgkinson, in order to remove the formula from the region of absurdity, adopted a correction of the form—$W = \frac{b \cdot c}{b + \frac{3}{4}c}$ (see Tarn's "Science of Building")—

which would drag almost any result, however absurd, into something like what practice would give. "M." should apply this correction, taking b as the breaking weight obtained by the formula, $7{\cdot}81\frac{D^4}{L^2}$, and c the crushing weight of the section—*i.e.*, the area in square inches multiplied by the weight that would crush a square inch—say, 2·5 tons per inch.—J. S.

[5505.]—**American Timber.**—I beg to thank "J. S." and "D. D." for their replies. "J. S." says that what is called "white pine" in America and "yellow pine" in England is the same wood—viz., the *Pinus strobus*. This information does not exactly agree with an extract which I find in my commonplace book, the authority of which I cannot now ascertain, but which is evidently Transatlantic. It says:—"Yellow pine (Pinus mitis), fine-grained, moderately resinous, strong, and durable, but the sapwood very inferior, decaying rapidly on exposure to the weather. In general use for framework. The tree is found throughout our country (United States), but in the greatest abundance in the middle States. In the Southern States it is known as spruce pine (which appears to me a contradiction of terms) and short-leaved pine." I have two questions. 1. Is that which is known in America as yellow pine (Pinus mitis) imported into England, and, if so, under what name is it sold? 2. Is that which is known in America as white pine (Pinus strobus), and which "J. S." says is known and sold in England as yellow pine, fit for framing for doors, &c? Is it hard enough, and will it, after being glued up, keep in a perfect plane without twisting or casting?—Wood.

[5514.]—**Damp Walls.**—Both the answers of "W. S." and Thos. Blashill to this question tend to mislead—in other words, they overlook the main cause of dampness. Thus "W. S." says, "it looks like a case of atmospheric condensation," and can scarcely credit a shower of rain penetrating a 14in. brick wall, and the wet to pour down inside! "W. S." has certainly not built with brick much in exposed situations, as I could show him several houses on the south coast—Ventnor, Cowes, Bournemouth, Brighton—many of them built by London architects, where on a rainy day the walls run with damp, although they are quite 14in. thick. Mr. Blashill asks the question, "How thick are the walls?" and says there are plenty of houses as much exposed which yet are dry. This may be, but they are built of hard-burnt bricks, are cemented, or are built hollow. An 18in. wall of ordinary bricks, such as those used about the suburbs of London, will let the wet through, and nothing but a hollow wall will check it. The outer face can, of course, be cemented and painted; and this remedy is probably as good as any. A thick brick wall is a delusion if built of ordinary bricks, which are often more porous than the mortar joints; but it must be observed that the joints themselves, if laid in mortar, are conducting capillary vessels to the interior.—Architectus.

[5514.]—**Damp Walls.**—Chip off plaster, and float ½in. thick with Portland cement and sharp sand, mixed in equal proportions. Have surface rough, and when set hard face with one coat of fine slag, to match rest of plastering. Do not paper until several weeks after plastering is dry.—A. P., Beccles.

[5516.]—**Contracts.**—I have had to do with several cases similar to that given by "Goth," and my experience is, that when an offer is given and accepted it becomes a bargain, by which the parties are legally bound to abide, notwithstanding the absence of any formal deed of contract, and that the party failing is liable to the party observing or willing to observe—which in this case is the contractor—for any expense he may have incurred in preparing his estimate, or for any damage he may prove to have sustained in consequence of the non-fulfilment of said bargain, but not for loss of anticipated profit.—R. L.

[5517.]—**Italian Architecture.**—The best work I know of on Italian architecture is Fergusson's "History of Modern Architecture." For more specific treatises "B. B." may consult Richardson's "Vitruvius Britannicus," published 1808; W. H. Leed's "Traveller's Club House, with essay on Italian Architecture (1839); Gailhabaud's "L'Architecture du Moyen Age et de la Renaissance," 1850; the article in the "Encyc. Brittanica," and "Gwilt's Encyclopædia." The best way to study Italian architecture, as, indeed, any other style, is to carefully read a good treatise such as Fergusson's "Handbook," and then to study actual buildings, or descriptions of them in the style, such as the works of Wren, Inigo Jones, Chambers, Palladio, &c. The Building News has given some of the best modern examples of Italian.—G. H. G.

[5530.]—**Ownership of Fence.**—The presumption of ownership is that the fence belongs to the owner of the land on whose side are the posts, because if it were otherwise the fence-owner would in the fixing either trespass his posts on his neighbour's land, or shut out by the pales from his own land the spaces between the posts, either of which it is assumed would be an unreasonable and imprudent act on his part. But this is a presumption which holds good in law only in the absence of better evidence of ownership. If the ownership can be proved in any better manner the proof will take the place of the presumption, and, in fact, fences are often fixed contrary to the usual rule above-mentioned.—L.

WATER SUPPLY AND SANITARY MATTERS.

Bridlington.—The Bridlington Local Board considered on Tuesday week a complaint resulting from the recent drainage schemes competition. Messrs. Oldham and Bohn, civil engineers, Hull, wrote pointing out that the board had awarded to Messrs. Brierly and Holt the premium for the best system of drainage, and then instructed the successful competitors to alter their outfall to the north pier, which practically amounted to the adoption of the writers' scheme. Messrs. Oldham and Bohn further requested that the two schemes should be submitted to the President of the Institution of Engineers as arbitrator. The clerk was directed to reply that the local board saw no reason to alter their decision, and declined to act as suggested.

Limerick City.—The condition, cost, and inadequacy of the water supply was discussed by the Limerick Town Council on Thursday in last week, and it was unanimously decided to serve legal notices on the waterworks company to appoint an arbitrator to treat for the purchase of their property by the Corporation under the new Public Health Act. About two years since the Town Council purchased the local gas works.

STAINED GLASS.

Littleover.—A stained-glass window, by Messrs. Hardman and Co., of Birmingham, has just been placed in the south side of Littleover Church, Derbyshire, in memory of the late John Tempest Morley. The window is in three lights, the centre being occupied by the Nativity, and on the right and left are the Visits of the Shepherds and Magi. Beneath is a brass plate bearing an inscription. The work of erection was executed by Mr. Woolhouse, of Derby.

The public opening of the new waterworks for the town of Llanelly was celebrated recently. The works consist of a reservoir and embankment of the Lliedi Valley, about two miles from the town. The water capacity of the reservoir is estimated at 160,000,000 gallons. The total cost has been £65,919. Messrs. Smith and Fawkes, of Southport, are the contractors, the engineers being Messrs. Barnes and Beardmore, of London. The borough surveyor (Mr. Douglas) has acted as local engineer.

The Corporation of Ipswich have determined to build an infectious diseases hospital from the designs of Mr. E. Buckham, borough surveyor. It will consist of four blocks, on the pavilion plan, for 24 patients, and is estimated to cost £3,630.

In our notice last week of the art metal work shown at the Sheffield Art Exhibition, by Messrs. Chubb and Co., we should have mentioned that the "Coventry Bronze" Fender, in the Queen Anne style, with medallions, &c., was exhibited in their collection by "The Coventry Bronze Art Metal Company." This unique specimen of art metal work will be on view at Messrs. Chubb's Art Metal Warehouse, 57, St Paul's-churchyard, for the next few days, and is really well worth inspection.

By the fall on Tuesday week of a travelling crane being used for stone-lifting on a viaduct at Moorswater, Cornwall, Mr. Gandy Cole, the resident engineer, from whose designs the viaduct was being constructed, was crushed to death.

The new vestry-hall at Penge being nearly completed, from the designs of Mr. Elkington, the vestry decided at their last meeting to invite tenders for an illuminated clock with three dials to be placed in the tower. Messrs. Bowyer are carrying out the building contract.

A reredos to the memory of the late Mr. Mundy, to be erected in Mackworth Church, is now being wrought at the atelier of Messrs. Hall and Co., Derby. The work, which is being carried out from the designs of Mr. J. K. Colling, of London, is formed in Derbyshire alabaster, freely inlaid with fluor spar, bluejohn, stalactite, lapis-lazuli, malachite, Cornish and Irish serpentines, and various Devonshire marbles. The east wall below the reredos is to be inlaid with a diaper of alabaster, with centres of dove and a border of green marble.

At the first half-yearly meeting of the Lynn and Fakenham Railway Company last week, it was announced that a contract had been entered into with Messrs. Wilkinson and Jarvis, of Victoria-street, Westminster, for the construction of the line, and that a commencement had been made with the work.

The new infantry barracks at Lincoln, which occupy an area of 24 acres, have just been completed. They are built as usual from plans by War-office officials. The cost has been £48,000. A portion of the works were carried out by a Lincoln firm, the remainder by Aldershot builders. The whole of the buildings are of brick, from the steam-works of Messrs. Swann Brothers, Lincoln.

The restoration of Holbeach Church, South Lincolnshire, has just ben commenced. Mr. Fawn is the contractor.

Our Office Table.

We regret to announce the death of Mr. Charles Bailey, formerly an architect in practice in Gracechurch-street, E.C., but recently retired from active business, and residing at Eastleigh, Reigate Hill. From the proceedings at the inquest held on Mr. Bailey's body on Friday, it seems that for some time he had been of unsound mind, and was constantly attended by a trained nurse. During her absence about 7 a.m. on Tuesday week, he rose from bed, opened the window, and was found on the ground 20ft. below, suffering from fractured ribs. He died from the injuries and shock on the following day. A verdict of "Suicide while of unsound mind," was returned by the jury. Mr. Bailey was sixty-three years of age.

The bells of St. Paul's were heard for the first time on Friday last. There are twelve bells, weighing together eleven tons, and they have been cast by Messrs. Taylor and Co., of Loughborough. The musical peal with which the campanile of St. Paul's is furnished has been contributed by several donors. The largest bell, a tenor, weighing 3 tons 3cwt., is the gift of the Corporation. The next, weighing 45cwt., has been supplied by the Grocers' Company; and then come the No. 10 bell, weighing 33cwt., bestowed by the Clothworkers; No. 9, by the Fishmongers; No. 8, by the Taylors; No. 7, by the Salters; the four next, in diminishing size, by the Turners' Company and Lady Burdett-Coutts; and the two smallest bells by the Drapers' Company. On one side of each bell is the emblematic device of the cathedral, the obverse bearing the arms and motto of the company presenting it, together with the name of the master at the time of the vote.

The trustees and judges appointed for carrying into effect the trusts of the will of the late Captain George Archibald Taylor, in reference to the income arising from the sum bequeathed by him for the promotion of art in Ireland, have announced the terms upon which £120 will be awarded, in the year 1879, for two scholarships and two prizes to art students. A sum of £95 to be applied to the formation of two scholarships, one of the value of £60, and the other of £35, to be open to students, male and female, under the conditions of the scheme; also two prizes, one of the value of £15, and the other of the value of £10. In the event of very marked talent being displayed by competitors for the scholarships, with promise of future excellence, it shall be discretionary in the trustees and judges to continue the scholarship for a second or third year, and, if advisable, to augment the amount. The exhibition of works in competition for prizes and scholarships is hereby fixed to be held on Thursday, April 17th, 1879. Such works must be sent in to Leinster House not later than Saturday, April 12th, 1879. The only limitation as to subject fixed by the judges for the competition of 1879 is as follows: The pictures must be either—1. Figure compositions containing not less than three figures. 2. Landscapes or sea pieces. The size of works in competition shall be not less than 2ft. by 1ft. 6in.; they may be executed either in oils or water-colours, and must be unframed. The prize of £10 is to be for the best work, without limitation as to subject, and such prize cannot be awarded to either of the works which shall have gained a scholarship.

We understand that the War Department have arranged to ship from Woolwich to-morrow, on board the Craig Forth, an additional number of huts, intended to form official headquarters at Cyprus for the Lord High Commissioner—Sir Garnet Wolseley—and for the Brigadier-General and staff. These huts have been constructed by Mr. George Shaw, of Westminster, and Messrs. Baker and Son, Lambeth, and the whole of the locks and door furniture supplied direct to the War Department by Mr. James Hill, of Upper Thames-street. The governor's house comprises a suite of extensive reception-rooms, dining-rooms, boudoir, study, bedrooms, bath-rooms, including rooms also for the aide-de-camp and private secretary, together with servants' rooms and every accommodation for an official residence.

We see from Dr. Dudfield's recently published report as medical officer of health for Kensington that the experiment of the vestry of that parish, in abolishing the contract system in dust removal and undertaking the duties with their own staff, has resulted satisfactorily. Dr. Dudfield states his belief that not only has no additional expense been incurred by the change of system, but rather the reverse, taking into consideration the fact that the sums demanded and paid for the work under contract rose yearly at a portentous rate. A large sum of money, indeed, has been received from the sale of dust to brickmakers: and this source of revenue might no doubt be considerably increased were it in the power of the vestry to sort the dust and sell in the best market the several constituents of the dust bins.

Mr. J. C. Robinson, of Swanage, urges, in a letter to a country journal, the desirability of holding a temporary exhibition in London of a loan collection of old English decorative art objects, similar, we presume, to the scientific appliances exhibition of two years since at South Kensington. In his letter Mr. Robinson points out the fortuitous manner in which the collections at the British and South Kensington Museums had been brought together, and to the heterogeneous nature of the collections housed in these institutions; and he remarks that the two collections are in many particulars concurrent and even counterparts of each other, and this is likely to increase as they are under very different government. The time has, he thinks, come when the special collections of the two museums should be regulated, and when to each should be assigned the care of certain definite branches and divisions of art. An interchange of specimens should be made on a give-and-take system, and no trenching on each other's settled specialities should be allowed to recur. Towards such an end, it is suggested, a special temporary collection, to which art treasures would be brought from both institutions, would materially assist.

The death of the President of the Royal Academy, Sir Francis Grant, occurred very suddenly on Saturday morning last, at his residence, The Lodge, Melton Mowbray, at the age of 75 years. The fourth son of a Perthshire laird, the late Mr. Francis Grant, of Kilgraston, by his marriage with Anne, daughter of Mr. Robert Oliphant, of Rossie, N.B., and brother of the late General Sir James Hope Grant, G.C.B., he was born in the year 1803, and was educated at Harrow School. He was already 30 years of age when he appeared as an exhibitor on the walls of the Royal Academy, in 1833 or 1834, and he gained his early reputation as a painter of sporting scenes and of portraits of the reigning beauties of the time. Among the former should be mentioned the "Meet of His Majesty's Staghounds," painted for Lord Chesterfield in 1837, and "The Melton Hunt," which found a purchaser in the Duke of Wellington. Both of these have been engraved, and are familiar to all lovers of field sports. In 1842 Mr. Grant was elected an Associate of the Royal Academy, and was raised to the full honours of that institution in 1851. In March, 1866, he was elected successor to Sir Charles Eastlake in the presidential chair, when the usual knighthood was conferred on him.

The alleged foul state of the Thames in the neighbourhood of the sewage outfalls is continuing to attract attention, and energetic action is being taken to bring the matter before the Metropolitan Board of Works, to which body a communication has been forwarded by the London Sanitary Committee. A discussion arose on Wednesday at the meeting of the members of the Woolwich Board of Health upon the foul state of the river in that neighbourhood, when it was generally agreed that steps should be immediately taken to procure samples of the water at a time of the tide as nearly as possible corresponding with that at which the Princess Alice was run down, in order to ascertain whether or not there is foundation for the assertion that some of the victims of the wreck were poisoned by the foul state of the water.

CHIPS.

The new Roman Catholic schools built in East Shaw and Bearhope-streets, Greenock, from the designs of Messrs. Ingram, Glasgow, were opened on Tuesday last by Archbishop Eyre. The accommodation provided is for 1,000 children, and the cost of the buildings will be £6,000.

The thirty-first annual dinner in aid of the Builders' Benevolent Institution, will take place at the Freemasons' Tavern on Thursday, Nov. 7. Mr. Edward Conder in the chair.

The governors of Addenbrooke's Hospital, Cambridge, decided last week to erect wards for children, contagious diseases of women, and surgical cases, in a new wing, together with baths, mortuary, laundry, &c., from plans prepared by Mr. Fawcett, of Cambridge, their architect. The expense is estimated at £3,000.

On Tuesday week the Roman Catholic Bishop of Beverley consecrated a new altar of our Lady in St Peter's Church, Scarborough. The altar stands at the east end of the Lady Chapel, and has been executed by Mr. Earp, of London, from the designs of Mr. G. Goldie, the architect of the church.

Memorial stones were laid on Tuesday week of a new English Presbyterian chapel in Vale-street, Denbigh. The building will be Gothic in style, and of the form of a Latin cross, comprising a nave 65ft. by 25ft., and transept 45ft. from end to end. The internal fittings will be of pitch pine, and the estimated cost £3,000. The architect is Mr. Owen Edwards, of Royal and Manchester; the contractor is Mr. Thos. Hughes, of Denbigh.

The parish church of Sutton St. James, South Lincolnshire, is about to be restored from the designs of Mr. W. Smith, of the Adelphi, London. The contract has been taken by Messrs. H. Brown and Sons, of Sutton St. James, at £1,084, and the work will be commenced at once.

An important addition to the attractions of the Brighton Aquarium was opened on Saturday week, consisting indeed of part of the original design of the architect, Mr. C. E. Birch. The entire length of the flats forming the roof of the Aquarium buildings has been converted into a terrace laid with asphalte, interspersed with beds of evergreens and flower and terra-cotta shield parterres. At one extremity is a chalet, with balcony and refreshment-rooms.

The Local Board for Wimbledon on Wednesday week appointed Mr. C. H. Cooper, of Scotland-yard, W.C., as assistant surveyor, from amongst 26 applicants. The board on this occasion held its first meeting in the new offices in the Merton-road, South Wimbledon, built from the designs of Mr. Goodchild. Messrs. Garrud have been the contractors.

On Saturday week the Mayor of Lynn (Mr. W. Thompson) entertained at dinner about 230 workmen and labourers, and their wives, from the firm of Thompson, Pattrick, and Woodwark, timber merchants, of which the mayor is the principal member. Mr. Pattrick is also a member of the town council, and Mr. Woodwark is chairman of the board of guardians.

Mr. Thomas Humble—a well-known contractor of Gateshead-on-Tyne—died on Friday very suddenly from the bursting of a blood vessel.

F. W. Reynolds and Co. have been awarded a silver prize medal at the Paris Exhibition for builders' machinery.

The third annual meeting and prize distribution in connection with the Reigate science and art classes was held on Wednesday week. The report showed that the class is attended by 132 students. Of the works sent to the Department for examination none were considered of sufficient merit to entitle to the full grant per student.

Some ancient stained glass removed from the windows of Saint Nicholas parish church, Great Yarmouth, has been recovered and re-fixed in two of the windows in the north aisle. The most perfect portion is a representation of the boy Samuel declaring to Eli the judgments about to fall on the house. Carved oak fronts are gradually being added to the choir seats.

At the committee meeting of the Salisbury Diocesan Society grants were paid in respect to restorations carried out in the churches of Affpuddle, Bourton, Portland, St. John, and Shapwick, all in Dorsetshire. £10 was voted towards a new church at Foxham, Wilts.

The Tottenham Local Board of Health having received sanction for borrowing £15,500 from the Local Government Board, is about to carry out extensive works of sewerage in the Southgate-road, of water supply and street improvement, under the supervision of the surveyor.

A parish room for the use of St. Mary-le-Elms, Ipswich, was opened last week. It is Queen Anne in style, is built of red brick, varied by the use of bands of yellow bricks, tile hanging, and plaster. The roof is of plain tiles. The dimensions are 39ft. by 18ft. The room was built by Mr. A. E. Coe, from designs given by Mr. E. F. Bisshopp.

At a town's meeting held at Birmingham, on Friday, a resolution was adopted authorising the town council to apply to Parliament for a five years' extension of the time limited for the construction of the water-works, and to borrow a further sum of £300,000 for water supply.

The Town Council of Hull have referred to the works committee in consultation with the borough engineer the question of the desirability or otherwise of sewer ventilation at cross-roads and through mill chimneys.

Drainage works are being carried out at Caistor and Market Rasen from the plans of Mr. John Addy, A.I.C.E., of Peterborough, and under the superintendence of Mr. Gill, C.E., and a clerk of works in each town.

At a meeting of the Old Swindon Local Board of Health on the 20th ult., the five selected candidates for the surveyorship and inspectorship of nuisances presented themselves for examination, and Mr. Thos. J. H. Davison, C.E., son of Mr. Thos. J. Davison, C.E., borough surveyor of Windsor, was elected to the post.

The Oswestry Grammar School has been undergoing renovation and improvements, and a new wing has been added, which was formally opened on Monday. The total cost of the works was £4,184. Mr. W. H. Spaull, of Oswestry, was the architect, Mr. R. Yates, of Shifnal, the contractor, and Messrs. Lewis Brothers, of Oswestry, the painters and decorators.

Hengler's cirque at Hull has been rebuilt on an enlarged scale in brick, re-roofed in felting and slate, and two galleries added. The work has been done under the superintendence of Mr. R. Beevers. Messrs. Wright and Dreyer have executed the alterations.

At Colchester Town Hall, on Saturday week, Mr. J. S. Smith held a Local Government Board inquiry with reference to an application to borrow £1,000 for the erection of an infectious diseases hospital, and of £5,000 for the purchase of premises adjoining the town hall, to permit of the enlargement of the building, and for widening West Stockwell-street.

A memorial stained-glass window is about to be placed in Epworth Church, Lincolnshire. It has been prepared by Mr. W. H. Constable, of Cambridge.

The excavation of the Wisbech Canal commenced on Monday week, eleven years having elapsed since the silt was last removed from the channel. For the work the tender of Mr. Barwell has been accepted at £1,345 10s. It was the lowest of five received by the canal company.

A Local Government Board inquiry was held at Goole on the 2nd inst., before Mr. J. T. Harrison, C.E., with respect to an application from the local board for sanction to borrow £4,000 for drainage and street-making. Evidence having been given by Mr. E. C. B. Tudor, surveyor, the inspector pronounced the drainage plan unworkable, owing to the insufficient fall, and advised the board to reconsider the matter, and make a fresh application to the central authority.

At the Cambridgeshire County Lunatic Asylum, at Fulbourne, a new dining and recreation room are about to be added on the male side, and other extensions effected at a total cost of £13,000. Mr. R. Reynolds Rowe, of Cambridge, is the architect to the visiting justices.

A correspondent of the *Oxford Chronicle* asserts that a new church at Nuneham, although finished more than two years since, has not been consecrated by the Bishop of Oxford, the objection assigned being that the church does not stand due east and west!

The new waterworks formed for the supply of Ruthin, by a limited liability company, were opened on Tuesday week. The reservoir and filter beds have been constructed by Mr. John Griffiths, contractor, of Trefynant, Ruabon, from the designs of Mr. Lloyd Williams, C.E., of Denbigh. Mr. Hughes was the acting superintending engineer.

Sir Charles Reed, in his annual statement to the London School Board of work accomplished during the past year, delivered on Wednesday week, said that the board has now under its control 187 permanent school buildings. The sites and buildings have averaged in cost £15 4s. per child.

St. Martin's Church, Liskeard, is being restored. The contract has been given to Mr. John Lang, builder, of Liskeard. The carving is being done by Mr. Harry Hems, Ecclesiastical Art Works, Exeter; and the restoration is being carried out under the supervision of Mr. R. Coad, architect, Duke-street, Adelphi, London.

The opening meeting of the 31st session of the Liverpool Architectural Society was held last week. Mr. Henry Sumners, the president, said the society now consisted of 48 fellows, 13 professional associates, 35 associates, 24 students, and 3 honorary corresponding members, making a total of 123. Financially they had a balance in hand.

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Sir Henry A. Hunt, C.B., the arbitrator in the case of the London Pavilion Music-hall, has sent in his award. Mr. Loibl claimed £147,000 for the freehold and goodwill, the building being required for the new street from Piccadilly to Oxford-street. The award is £109,300.

The old parish church of Stoke Gabriel, dedicated to St. Gabriel, is being renovated, and new roofs are being put on the body of the church and to the aisles. Their designing has been entrusted to Messrs. John Hayward and Son, of Exeter. The chancel arch is foiled, and has carved cusp terminations. The carving is in the hands of Mr. Harry Hems, of Exeter, and the contractor for the whole of the present work is Mr. Crocker, builder, Torquay.

The Bridgwater School Board have accepted an amended and reduced tender of Messrs. Chedzoy and Son, of Bridgwater, amounting to £3,224 9s. 3d., for the erection of their new schools in Albert-street for 700 children, being at a cost of £4 12s. per head. Mr. J. Parker, the borough surveyor, is the architect.

A Primitive Methodist new chapel, Ashford, near Ludlow, Salop, has just been opened. The works have been executed from the designs and under the superintendence of Mr. Arthur Morry, architect, St. Peter's Chambers, Manchester.

The Chertsey rural sanitary authority have adopted a design by Mr. Stephen Brown for a pillar fountain to be erected at Weybridge, and one prepared by Messrs. Herring and Son for a drinking fountain and cattle trough for Goosepool, Chertsey.

At the autumnal meeting of the Gloucester and Bristol Diocesan Association, held on the 1st inst., the following grants were made:—Churches: Sutton-under-Brailes, £65; St. Mary, Fishponds, £80; Naunton, £10; St. Thomas, Bristol, £50; Hanham Abbotts, £20; Iron Acton, £60; and additional £60 if new aisle be added; Lea and Cleverton, £75; Schools: Seagry, £15; Glebe-house, St. Gabriel, Bristol, £80.

The new parish church of Crofton, situated on the Solent, was consecrated last week. The style is Early English, and the church consists of nave, north and south aisles, organ chamber, and lower course of tower (in north-west angle), surmounted with turret. The material is flint, with Bath stone dressings, and the interior Isle of Wight brick. It is benched to accommodate 550 persons. The total cost will be somewhat under £4,000. A reredos and alabaster super altar (by Minton) has been given. Mr. Goodchild, of Duke-street, Adelphi, was the architect, and Messrs. Plummer and Gamblin, of Fareham, the builders.

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Trade News.

WAGES MOVEMENT.

ABERDEEN.—About 500 house carpenters and joiners struck work on Tuesday week against a reduction from 7½d. to 7d. per hour, and specially because the masters, while intimating three months ago that there would be a reduction in wages, did not state what the reduction would be. The strike still continues. Messrs. Jas. Garvie and Sons, who are among the most extensive employers of labour in the trade, have been advertising for a large number of joiners. Several strangers who arrived have been induced to return to Glasgow.

CARLISLE.—The masons employed by Messrs. C. and J. Armstrong and M. Milburn have come out on strike. The dispute is as to a re-apportionment of wages. The masons' wages are in Carlisle 33s. per week—viz., 5s. 10d. for each of the first five days, and 3s. 10d. for the half-day on Saturday. The union men ask that the pay shall remain the same, but adjusted to a uniform scale of 6s. a day and 3s. for Saturday. This the above-mentioned masters decline, as they say the less steady men would not, under this system, come to work on Saturdays.

EDINBURGH.—Some stir was occasioned in several masons' yards on Tuesday by the circulation of a statement to the effect that one of the largest employers of labour in the Edinburgh building trade had given notice of a reduction of 1d. per hour on the standard rate of wages at present paid to operative masons, a corresponding reduction being at the same time intimated on the wages of the labourers. The reason assigned for the reduction is said to be the depressed state of the trade, and the movement thus initiated is believed in some quarters to be preliminary to a general reduction of wages in the building trade, not only in Edinburgh, but throughout Scotland. Six months ago the operative masons submitted to a reduction of wages from 9d. to 8d. per hour; so that the one now in question will bring the rate of payment down to 7d. per hour, while the wages of the labourers will be at the rate of 4½d. per hour. A large number of hands are stated to be going about the country at present in search of employment.

SOUTH SHIELDS.—At a meeting on Friday night of the operative joiners, who have now been out on strike for 20 weeks, it was resolved to abide by the resolution opposing the reduction of wages. It was reported that many hands lately on strike had obtained work at the old wages.

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These SLATES are of a grey-green tint, are stout, and made in all sizes. A large stock available for immediate delivery. For further particulars (with a list of important buildings covered) apply to the MANAGER, Clynderwen, R.S.O., Carmarthenshire.—[ADVT.]

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TENDERS.

ANDOVER.—For alterations to shop in High-street for Mr. J. Chevis. Mr. J. Miller, architect, London:—

Beale (accepted)	£144

ARMLEY, NEAR LEEDS.—For building five warehouses for the Earl of Dudley. Mr. J. Whittington, architect, Nottingham; quantities by Mr. W. Hofmann Wood, London and Leeds:—

Smith, J., and Son	£8,678	0	0
Brown, T. and W.	8,040	10	0
Craven, C.	8,000	0	0
Bishopp, J.	7,994	8	6
Gard, R. W., and Co. (accepted) ...	7,985	4	0

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N.B.—DIAGRAMS AND PROSPECTUSES ON APPLICATION.

THE BUILDING NEWS.

LONDON, FRIDAY, OCTOBER 18, 1873.

THE RUINS OF THE ESQUILINE AND FORUM.

THE results of the investigations undertaken by MM. Boissier, Jordan, Brizio, and Lanciani, among the most interesting of the Roman remains have now been made known to the various archæological societies of Europe. An imperfect sketch of them was published without authority last year; but the account is now complete, and will probably be given to the public in a short time. There is a part of the Italian capital which is still antique. It has nothing to do with the Corso, the Place of the People, or the Square of Venice. Thence, a deeply-scarped street, in which the shops resemble caverns cut in the rock, leads to the Forum, and there the recent discoveries, as well as on the Esquiline Hill, have been made. In 1870, by a Royal decree, the Roman ruins were placed under the protection of a special department, and, in the autumn of that year, explorations were commenced on the site of the Forum, of Caracalla's Baths, of the Farnese Gardens, and of Hadrian's Villa. They have since been suspended from time to time, owing to a failure of the necessary funds. Nevertheless, splendid fruits have been gathered from this work of research—of the more national importance in that it was expressly forbidden to appropriate a single statue, any object of art whatever, or even coin, to enrich a private collection. There have thus been saved from dilapidation and pillage, numerous painted roofs and vault-shaped fragments of pavement in mosaic, and fragments also of marble walls. These, a few years ago, would have been mercilessly torn from their original positions. and carried off to adorn the amateur galleries of America or Europe. For example, when at Porto, the pick-axes of workmen struck upon the broken roofs of a magnificent palace, long buried beneath the dust of time, the whole of the wealth so discovered was carted away before even a plan of the structure could be traced. On the Esquiline, however, have now been brought to light, far beneath the foundations of the modern houses planted there, layer upon layer of ruin, indicating not merely the life of many successive generations, but of many generations which, in point of time, must have flourished widely apart from one another. To give an instance: The church of St. Clement dates from the 12th century, and is an admirable illustration of its architecture, besides containing the marvellous frescoes of Masaccio. Below its basement was actually found the skeleton, not of a pagan temple, but of an older Christian basilica, ornamented with marble pillars and curious paintings. Below this again was found a sanctuary dedicated to Mithra, with a Roman dwelling-house belonging to the earliest days of the Empire; deeper still, relics of the Republic; deeper yet, traces of the kings—the rarest of any. Rome, in fact, during the long course of its career has been again and again rebuilt, one city rising above the dilapidation of its predecessors. Among the evidences of this few are more important than those recently produced from, as it were, the very heart of the Esquiline Hill, which, although not the most renowned among the Seven, possesses characteristic annals of its own. It was there that executions took place, freemen being decapitated on a block, and slaves hung upon a gibbet—there paupers were buried—and it is there that those singular common graves were discovered which disturbed the calculations of Augustus and Mecænas when they resolved to transform the entire hill into a monument of marble splendour. From amid the remains of all this have been brought up wonderful paintings, representing the foundation of Lavinium, the death of Æneas, and "the Kings of the Latins," and a number of tablets inscribed with regulations for the treatment of slaves. When the trenches were opened by these latest explorers they exposed at first only heaps of bones and the common sepulchres already referred to; soon, however, the searchers came upon a different class of curiosities, so to term them: small rectangular chambers, partly hollowed in the rock, and partly formed of walls, cyclopean in their strength and massiveness. These, without communicating with each other, were arranged in regular rows, and could only be entered from the top, whence, it is conjectured, the bodies of the dead were thrown or lowered into them uncoffined, since no vestiges of any sarcophagi have been detected, though bones, and even ashes—the presence of the latter being utterly unexplained—abound. At this point an unexpected revelation took place. When the rubbish had been cleared away, and it was found that the flooring of this sepulchral abode was the solid rock, the explorers almost gave up the idea of finding anything to reward their search below it. They were mistaken, however. Accident led them to break open other tombs, which the French archæologists declare to be older than the Wall of Servius, and therefore contemporary with the reigns of the kings. If this should be established as a truth, it will be among the most vivid lights cast upon the realities of that which has been hitherto accounted as little more than a mythological period of Roman history. Comparatively few years could have elapsed between the foundation of the city and the digging of these graves. It was, consequently, a matter of intense interest to ascertain their contents. There were funeral couches of rude construction, whence the trappings, whatever they had been, were, of course, utterly mouldered away—with vases, cups, and lamps of pure Etruscan style, significant of a migration from the other side of the Tiber. The walls, moreover, which lined the hollows in the rock, were composed of large-squared stones, such as characterised the Tuscan mortuary architecture of that epoch. It was above this double stage of tombs that Mecænas laid out his celebrated gardens. He covered them over with 20ft. of artificial soil, and thought, no doubt, that they had been buried out of human sight and knowledge for ever. But his own creations—baths, race-courses, academies, and so forth—were also destined to be dug out of the earth after ages of concealment and oblivion.

It is four years since the first glimpse was obtained of that wonderful palace, entombed in the heart of the Esquiline Hill, of which a full description is now, for the first time, given to the world. While excavating for the foundations of a new house some workmen came, almost on a level with the upper soil, upon the summit of an ancient wall, curvilinear in shape, upon which traces of colour could be detected. Careful examination revealed the remains, singularly well preserved, of a palatial chamber—80ft. long, and upwards of 30ft. wide—which had evidently been decorated with great magnificence. The flooring was of marble, not all destroyed; the roof had rested upon an elegant cornice of stucco; the walls were painted red; at each end, framed within borders of ebony black, were paintings of ebony black, were paintings of demigods, nymphs, and landscapes, exhibiting traces of varied and brilliant tints. Along the side walls, at regular intervals, were niches, resembling blind windows, but beautifully adorned with patches of blue sky, masses of rich verdure, flowers. trees, and birds—far more perfect, the French author declares, than the very best examples from Pompeii. It was at this epoch, indeed, that, according to Pliny, the art of wall-decoration rose, among the Italians, to its acme. Seldom has tradition so completely verified itself as through these discoveries. The descriptions of Pliny correspond, with an exactitude that is amazing, to the illustrations which have been laid before us within the last four months. To what use, however, the archæologists inquire, was this vast and gorgeous chamber destined? The question is answered, in some sort, by the character of the construction itself. At one end is a hemicycle, around which seven ranks of seats rise, by concentric gradations, in amphitheatrical arrangement, up to a platform. At the opposite extremity, in the midst of a wall, traces are visible of a tribune, or place for an orchestra, yet suggesting rather the notion of a public reading-room—an institution familiar throughout the Roman empire—than of a musical or rhetorical festival. The painted places, discovered after so many centuries of mystery, plainly point out the rest. At the foot of the tribune, on the marble pavement, were the chairs of the high personages assembled; on the steps of the hemicycle were assembled the common people, obscure friends, clients, plaintiffs, and others, who came officially to applaud whatever was presented to their admiration. The whole of this is now as clear as though it were represented by a model. If that alone had been the result of the discoveries just illustrated it would suffice to mark a memorable point in the chronicles of Roman archæology; but the discoveries beneath the site of the Forum are equally important, and not less interesting. They were carried on without interruption by Signor Rosa during a period of two years. To begin with, only minute fragments of ornament and delicate remnants of sculpture were turned up from the heavy earthy masses, which the progress of time has accumulated within that traditional area. By degrees, however, the basement outlines of temples and the pedestals of fallen statues could be fixed with an assurance approaching to certainty; columns of marble, and of stones more precious still, could be re-erected precisely where they were supposed to have fallen; and something like an idea has been gained, far more distinctly than that suggested in the old textbooks, of what the Forum was when it constituted the heart and centre of the Roman Empire. Never in her highest days of pride and conquest did Rome create anything to surpass the Forum, which survived the barbaric invasion, the conquests of the Goths and Vandals, and even the inroads of the modern spoliators. But the entire fabric, nevertheless, fell into ruin, and it is this ruin which our French archæologists have in the second half of the nineteenth century illustrated by a series of brilliant discoveries. They began by disinterring a number of marble columns, completely buried, yet still standing upright; they went on to do, as they have done effectually—discredit the accepted plans of the Forum, and they questioned the limits generally assigned to it from the Arch of Severus to that of Titus, or, in Catholic days, from St. Adrian to St. Theodore. Nearly a hundred and fifty thousand square yards of earth were displaced in order to arrive at a result; but in the end the excavators believe themselves justified in saying with triumph, "The topography of the Forum is decided." We have only to remember its history in order to appreciate the interest of this announcement, which, we may be sure, in the name of so earnestly scientific a nation as the French, is not lightly made. The works resolved upon were carried out with as much scruple

as enthusiasm. They commenced with an underpinning of the Salian Basilica, and the driving of shafts and tunnels far beneath its basement, though the edifice itself was a monument of classic antiquity worthy of all investigation—with its vast expanse of artistic pavement, its circle upon circle of curious architecture, its singular divisions of space between games and worship, and its remarkable inscription, indicating a place at once of commerce and of piety: "Those who win, laugh; those who lose, weep." The pavement preserves the marks of columns which have totally disappeared; these are obviously two ranges of porticoes, serving as popular promenades. Within these was a court of justice, with a bench capable of seating a hundred and eighty judges, if not more—seats for the advocates, a great "well" for clients and their friends, and a "body of the court" for the accommodation of the public at large. Precisely from such a tribunal is Caligula described as having flung money to corrupt the populace. The exertions of the French antiquarians, moreover, have brought to light the buried ruins of many temples, of which, though various writers have described them, no remains were believed to exist; one erected by Cæsar, and dedicated to him—another, of far more venerable date, betwen the monuments of Phocas and Domitian—and a third, in which occurs a labyrinth of staircases of singular structure, to which no date can with any certainty be attributed. Altogether, these fresh discoveries at Rome, instead of exhausting the mysteries that still lie hidden beneath its modern surface, promise an almost endless series of revelations yet to come, which shall throw a light, brilliant as that given forth by Herculaneum and Pompeii, upon the arts and manners of an epoch whence so much of our own manners and arts are inherited. We have still a large volume of unpublished reports to notice before this new chronicle of Roman artistic and archæological inquiry can be put out of hand.

A DAIRY HOMESTEAD COMPETITION.

[SECOND NOTICE.]

IN fulfilment of our promise we now return to the designs submitted in competition for the prizes offered by the British Dairy Farmers' Association, which have been on view at the Agricultural Hall, Islington. Last week we described as fully as our short time permitted the general features of the designs so far as they had been hung; we now intend to enter more into detail, and to make a few remarks upon the merits and weaknesses of the prize plans, and one or two others we consider worth notice. In our last article we omitted to mention the design under the motto of "Detur digniori," by Mr. Thomas Potter, of Alresford, Hants, to which the second prize has been awarded—our simple but sufficient apology for the omission being that Mr. Potter's design had not, at the time we left the hall, been hung; we, however, are glad to say something about it. There are a few well-recognised principles to be observed in the planning and construction of agricultural buildings, about which farmers are tolerably agreed. The first is the desirability of economical and substantial erections, so placed as to facilitate the work of the labourer in the preparation of food for the live stock; the second, covered yards, capable of affording shelter and warmth to the cattle; the third, good drainage; and the fourth, plenty of light and efficient ventilation. Applying these tests to the plans before us, we find substantiality sacrificed in most of the best plans—that is to say, the authors have adopted iron more from a desire to secure sanitation and economise cost, than with the intention of substance and durability—we will not say architectural effect, as, of course, that consideration is one of subordinate importance in farmsteads. The covered yard is adopted by both the prize designs, but in two very different ways, which we shall describe by-and-bye—while some plans only partially provide it, and others adopt the open yard. It cannot be denied that warmth is a very desirable element in farm economy, and the manure of covered yards has been found by Prof.

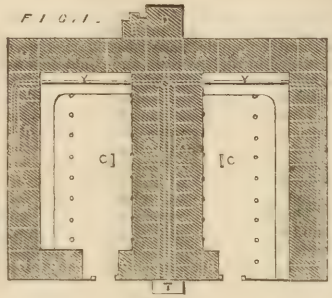


Fig. I.

A A Cow standings.
B Food-preparing shed.
C Covered yards.
D Barn.
E Engine-house.
F Cart-horse stables.
G Waggons.
H Implements.
K Cowsheds.
L Loose boxes.
M Nag's stable.
N Carriages.
O Fowls.
P Piggeries.
Q Calves.
T Liquid manure tank.
Y Tramway.

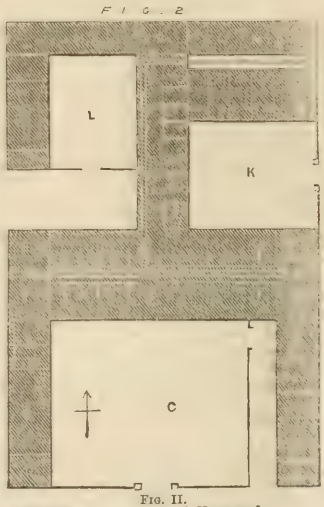


Fig. II.

A Cowhouse.
B Food-preparing shed.
C Covered yard.
D Store.
E Stables, &c.
F F Calves.
G Poultry.
H Box.
K Pig-yard and piggeries.
L Horse yard.
M Carts and waggons.
N Implement shed.
O 10-horse grass-chopper engine.
P Cart-horse stable, &c.
Q Infirmary.
R Cowhouses.

Voelckner and others "to be worth quite one-half more than manure made in open yards under similar circumstances." Most farmers, we imagine, if not trammelled by landlords and vested interests, would gladly exchange their open yards for covered ones, as even the most prejudiced in favour of old customs would allow that cows and stock, if sheltered, are improved in quality, while the farmyard manure is not impoverished by the rain. Since our last article was written the first prize—a silver medal and £10—has been awarded to "Ich Dien" (Mr. Gilbert Murray, of Elvaston Castle). This plan, as we observed then, possesses unmistakeable merits, and exhibits the care and detail of one master of his subject. We can only regret that a little architectural skill in the way of grouping has not been brought to bear upon an exceedingly simple and well thought-out plan. Mr. Murray's design, we may repeat, consists of four blocks or ranges of sheds, in the form of a parallelogram, or one long shed, and three projecting wings, at right angles thereto, enclosing two covered yards, of which we give an outline block plan (Fig. 1). The cow-house forms the centre building, and consists of a double row of cow standings, 13 in each row. Down the centre, between the stalls, is a tramway for feeding, communicating with the food-preparing department at the end, where are placed the mill, worked by an engine at the back; the chaff and roots store, with a small barn behind, which the author says might be dispensed with. The cross tramway and footpaths communicate, it will be seen, with the lateral wings on each side, the stables, cow-sheds, and piggeries. The implements, waggons, and cart-horse stable are placed in the long end range, while the yards are well sheltered on three sides, and are devoted to the use of the live stock. The two yards are covered by span roofs of flat pitch, with iron principals, supported on cast-iron hollow columns, and are well provided with upper raised light for ventilation. There are five parallel rows of roofs, which comprise the cowsheds as well as the yards. It is rather a question whether the two lines of columns in the yards are desirable, and whether it would not have been better to have spanned the yards by single roofs, so as to give an unimpeded area for cattle and carts. The author uses timber rafters with iron trussing. The yards are drained by 6in. and 4in. drains, the smaller ones being connected with the columns which serve as down pipes, and the 6in. pipes discharge the water into troughs in each yard. The author suggests a steam engine to pump the water into a reservoir, so that it may be used for the various departments—a very necessary provision in large farmsteads. We notice that each yard is divided by an iron railing into two parts to be used as occasion demands. The walls in this plan are shown of 9in. brick externally, but the cow-houses and many of the divisions are of iron fencing, while the roofing of the covered yards is of slate—half-slated, to give ventilation. We have chiefly confined our attention to the homestead itself. The farm-house is compact, and the dairy small, the house being located on the left side of the yards. "Detur Digniori," by Mr. Thos. Potter, of Alresford, Hants, wins the second prize—bronze medal, and £5. We illustrate this plan also (Fig. 2), and it will be noticed that a very different arrangement is adopted. The plan is at first sight not so simple, but on a closer examination it will be found that the main departments have been located with a practical regard to economical distribution. The cow-house has its entrance facing south, and extends nearly the entire breadth of land from east to west. The covered yard in front is 70ft. 6in. by 63ft., and is open to the south. It is shown roofed by one wide-span roof of iron 63ft. wide, the object being, the author says, to avoid roof-gutters and overflows, and to allow the cattle freedom of movement. The author justly remarks on the danger of supports and their obstruction, and frequent damage of them; at the same time we cannot approve of the very flat construction adopted, and would suggest the lantern form as far more appropriate, and equally inexpensive as the one shown. One point of importance is that the yard is well screened on three sides, and from the

north-east. The buildings on the west side of this yard comprise on the ground level an infirmary well removed from the healthy cattle, a store for seed and sacks, two calving-boxes near the cow-houses, while above is a straw loft. The convenience of the latter consists in the occupier being able, by means of a wide doorway to the road adjoining, to deposit the straw by an elevator, and by another opening on the covered yard-side to supply the litter where necessary. The cow-house is 89ft. by 32ft., and the stalls are placed head to head with the usual feeding passage and tram between, and there are two rows of six stalls in each half of the house. Calf-houses are well placed at the end of this block. Centrally located in the rear, and at right angles, is a long food-preparing house 80ft. by 22ft. Above this are the chaff, cake, and meal-rooms, and granary, the last being conveniently placed above the food-preparing portion. The chaff bin is supplied from the chaff cutter immediately above through a trap door, the cake and meal being supplied in the same way to bins below. The author, in describing this part of his design, says, "Barford and Perkins' steam generator is placed in proximity to the chaff-room, and on the other side of the generator is the root-cutter and pulper. As the machinery shafting is fixed as close to the roof as possible to avoid danger from pulleys and driving-belts, and to leave all the clear space for working, it is necessary for driving the root-cutter, which is the only machine on the ground floor, to employ a countershaft and pulley on the upper floor, and have a vertical driving belt; but this is an advantage, as unimpeded space is obtained for unloading roots from carts close to the machine." We find the author provides a fixed steam-engine and boiler for steaming the cattle food, farm refuse, and for boiling meal and grains for pig food. To do this hot water "is brought from the steam boiler and made to circulate round a jacketed copper, fixed close to the piggeries so as to save fuel, and attendance." The piggeries have large covered courts, besides open yards in front, and are supplied with food by a tramway at the back, which also traverses the food-shed and cow-house. "An underground tank near the pig boiler receives by stoneware pipes the whey from cheese-room and skimmed milk from milk-room, a pump pumping the same into the pig boiler." We may note that the waggon and implement-sheds are placed in the north shed, and are sheltered from the driving south-west rains and scorching suns, and the cart-horse stables are facing the east, to receive the morning sun.

Our plan does not show the dairy buildings, which form a distinct range facing north. On the south they are sheltered by the farm-house contiguous, a passage being obtained between them from east to west for ventilation and air. The milk-room, cheese or press room are placed in direct communication, and the walls and floors are proposed to be of non-absorbent materials. To keep a cool temperature sliding air bricks are inserted near the floor level, and exhaust ventilators or louvres in the roofs. Hollow or concrete walls are suggested—slate slabs, cement floors, windows of rough plate, or double casements, and other sanitary precautions have been introduced. The heavily tinted perspective does ill justice to this design; and the style of building, though plain, admits of improvement.

"A 101" ("commended" by the judges) is the design, we understand, of Mr. W. Norman, architect, Dorchester. We described its general features last week as quadrangular, with an open yard in the centre. The cow-houses form three sides; the piggeries are on the fourth. Some care and knowledge is evident, and of the open-yard plans this is the best undoubtedly. The details have been skilfully studied, especially the piggeries. These have a boiling-house at one end, and tank with a 3in. pipe laid from the dairy to convey the whey into the latter. From the tank it is pumped, and run into a pipe or feeding trough. Movable flaps are shown, in a detail drawing, for the piggeries, and a feeding path behind. A manure tank is placed in the centre of the yard, and a concrete pathway surrounds it, and gives access to the different sheds. Wooden cow-stalls are shown of simple but substantial construction, the troughs being of wood. We observe, too, that the authors suggest sliding doors, by far the best if properly run, that the dairy windows have glazed casements, with perforated zinc on the outside, and shutters inside, and a lift from dairy to cheese-room over is provided. The design we spoke in commendation of last week, "There they wait their wonted provender," &c., we find is the joint production of Mr. Jas. Cowie, of Bromley, and Mr. W. S. R. Payne, architect, of Fenchurch-street. Perhaps the only fault of plan is the great length of cow-shed and the single row of standings. In other respects there is much to be said in favour of the design, and architecturally it holds certainly the highest place. "Royal Oak" errs in dividing his cow-sheds, and in the stall arrangement, though there is a careful study of detail in the food-preparing department. There are two models. One, No. 618, shows an ⊓-shaped arrangement, and two yards; another, No. 619, places the sheds for cows under a corrugated iron roof of three spans, the stable forming a cross shed in the rear, and the piggeries on one side—a not very economical disposition of the area. Though models assist popular comprehension they should be accompanied by plans, and possibly this omission has been rather prejudicial in the eyes of the professional referees. In conclusion, we may just add to our remarks on the design, "Bloomsbury," the qualifying observation, that if less area had been taken up, and better detail shown, there would have been a claim, and the grouping and arrangement would have commended itself to us far more than it did on our first view. The perspective gives a better idea of the plan than the heavily-tinted and scarcely-finished drawings and elevation.

WATERLOO BRIDGE AND ITS SOUTHERN APPROACHES.

THE abolition of the toll on Waterloo-bridge will probably lead to some improvements being made in a sadly-neglected line of thoroughfare from the south end of that bridge to St. George's-circus. Considering that the Waterloo-bridge approach is one of the finest to the Middlesex shore, that the view of the Thames and the banks of the river from this bridge is acknowledged to surpass that from Westminster, Blackfriars, and London bridges, that it is the most central as regards the City and western districts, and is the most direct communication from north to south, it would certainly savour of a narrow policy if the Metropolitan Board of Works did not turn its attention to the improvement of this populous and much-deteriorated part of London. Waterloo-road has for years suffered from the toll, and has moreover enjoyed an unenviable reputation as a commercial thoroughfare. It has been unquestionably one of the dirtiest of the roadways in the Lambeth district, and the houses are, with few exceptions, of the most dilapidated character. Notwithstanding these drawbacks—due principally to the toll-bars—the road is wide and straight, and it is the main approach to the Waterloo terminus of the London and South-Western Railway. Architecturally there is nothing very striking in Waterloo-road, the principal building being St. John's Church, built in 1824, in the Grecian Doric order, with a hexastyle portico, upon a site formerly a horse-pond—a type of edifice common fifty years ago, and of which several remain in London and the suburbs. By the way, it contains the tomb of Elliston, the comedian, a friend of Charles Mathews, and immortalised by Charles Lamb. The South-Western terminus has been lately extended, but in a style altogether unworthy of railway architecture. The Victoria Palace Theatre, with its hideous flank wall, abuts upon the road, and perhaps at this point its worst part commences, as it intersects that still less reputable thoroughfare—the "New Cut." From this junction southward to the Obelisk the Waterloo-road is composed of a most dilapidated class of houses. Some of them have seen better days, but are now tenanted by a very mixed class of tradesmen. Sooner or later they must come down; many are in a very tottering condition if not already condemned, and their sites would afford some very desirable frontages for business premises. A very central and desirable site this would be, in our opinion, for baths and washhouses for the poorer classes living in the neighbourhood of the Obelisk, or in those dens of misery and disease between Lambeth-marsh, the New-cut, and the Westminster Bridge-road. A row of buildings let at moderate rental, with shops below, built so that each story could be let off to respectable tenants, would be a good speculation. When improvement takes place here—and this cannot long be deferred—a reconstruction of St. George's-circus may be desirable. This at present is a very important point of convergence of six main thoroughfares from every part of London—viz., the Borough-road, Blackfriars-road, Waterloo-road, and Westminster-road (which are bridge roads), besides Lambeth-road and London-road, leading to Newington and the southern districts. These roadways are all wide and direct lines—two of them are tramway routes—and by making the Circus rather larger a very important and improving locality might in time take the place of a very squalid one. The latest and most important step towards the amelioration of this locality is the removal of the Waterloo toll; another will be the opening of a better route to the City *viâ* a new bridge; and there remains only a third improvement that we have always thought a desideratum—namely, a direct line of communication from Waterloo Bridge northwards. The detour from this part of the Strand, say, to the Great Northern Railway, is anything but pleasant.

Thus we have Wellington-street and Bow-street, a break at Long-acre into Drury-lane near the theatre, and another interruption at Holborn, after which we are obliged to take either Southampton-row or Gray's Inn-lane, to lead us to the Euston-road. A better line of thoroughfare could be improvised by improving Wellington-street or diverting Bow-street, and prolonging them through Drury-lane into Holborn, as, after all, the main difficulty lies in the block of buildings between the Strand and Holborn. We need not now stay to descant upon the valuable opening-up of dense and unsavoury localities these suggestions would effect, and what splendid frontages could be formed, well adapted for business purposes. There is a crying and generally-admitted want of a central line of access from the Strand to the main northern stations of Euston, St. Pancras, and King's-cross, but the public have been deprived of it by the large vested interests that have hitherto blocked the way. One of these has been removed; let us hope the others will follow.

A CHAPTER ON ROOFS OF THE RENAISSANCE.—II.

WHEN in the sixteenth century permanent theatres began to be erected, a demand for roofs of great capacity and strength, yet of economical construction to meet the numerous accessorial purposes of the stage was created. In addition to mere covering, such roofs accordingly furnished space for workshops and store-rooms in which numerous assistants pursued their busy occupations in the midst of dry combustible materials. Between them and the auditorium there was commonly no impervious division, and frequent destruction by fire was but too certain a consequence. On rebuilding Covent Garden in 1857, Mr. E. M. Barry made the roof of iron, Serlio built a theatre at Vicenza, and Palladio one at Venice, on Vitruvian rules; "but the latter," Mr. Fergusson observes, "designed the celebrated Teatro Olympico, at Vicenza, which still stands a monument of his classical taste, and boasts of being the oldest permanent theatre in Europe—at least of those built since the time of the Romans." It was scarcely advanced beyond the foundations at Palladio's death, but was carried forward by his son, Silla, and finally Scamozzi "directed the standing scenes;" but the roof has no commanding feature. The architects of the Aliberti, Tordinona, and Argentina theatres, at Rome, were born and died between 1634 and 1766. The roof of the Argentina (Fig. 5) bears a striking resemblance to that of the basilica of St. Paul. It is of the same pitch, has a space of 80ft., has the same tile covering and overhanging eaves. The common rafters have similar but more numerous purlins, the great principal rafters and short king post, the auxiliary or cushion or trussing rafters, the long straining beam, and short queen-posts. The bolster-pieces or corbels under the ends of the tie-beam are here made in two courses. The most noticeable difference consists in supporting the strainer by an iron stirrup in connection with the king-post and principals, and supporting the tie-beam by two iron stirrups from the strainer and near the centre, in lieu of the wooden suspender used at St. Paul's. Both are framed of fir timber, and in point of general resemblance no parallel could be stronger nor more indicative of a common designer. But the Argentina is attributed to the Marchese Girolamo Teodoli, who died in 1766; or, by some, to Frediani.

The earliest house on the horse-shoe plan at Rome was the Tordinona, designed by Carlo Fontana, in 1675. Of the chief existing London theatres the dates are pretty certain. The site of Her Majesty's, in the Haymarket, was first devoted to the Muses by Sir John Vanbrugh, early in the 18th century; the "little" theatre there, 1720; Covent Garden, 1733. Drury-lane has had longer hold of the soil, and the present house counts as the fourth. The third afforded one of those successful examples of carpentry that command a lasting admiration, and serve as enduring models (see Fig. 6). It was built in 1793, under Mr. Henry Holland, architect, by Mr. Edward Grey Saunders, carpenter. The length was about 200ft., and the clear span 80ft. 3½in. The trusses were 15ft. apart. Very ample accommodation for carpenters and painters was obtained in the middle space (32ft. wide), and at the sides were dressing-rooms, store rooms, &c., with flat ceilings. The disposition of the load is very apparent. The central span and half of each of the side roofs were borne by the great trusses; the other halves of the side roofs by the walls. The truss was 12in. thick; tie beams, 15in. deep; queen-posts, 15in. wide; strainer, 12in. square; the sloping braces, or principals, 14in. deep at the base, and 12in. at the top. From the foot of the queen-post to the middle of this raking beam was a strut, 8in. by 12in., but the effect was doubtful; nor did any reason appear for making the principal deeper at one end than the other, as both must be equally strained. Tredgold has evidently looked at the frame in the same light, for one of his figures, cursorily regarded as a correct copy of Mr. Holland's design, proves, on more careful collation, to be without the strut, and the principal is of the same depth throughout. In the representation here given I notice that the tapering form of the timber fairly marked on the drawing has become parallel in the process of engraving. Of course any addition to a compressed beam should be made in the middle. The roof of a theatre is heavily charged. For the cover, with its frame, and stress of wind and snow, 60lb. to the foot would be a maximum. But added to that is the suspended floor and ceiling, stores, machinery, and a throng of busy employés. This surcharge was not perhaps sufficiently provided for, but, subject to a possibly too great confidence, Mr. Holland produced a magnificent example. It was unfortunately of brief duration, and consumed in 1809.

> The troubled shade of Garrick, hovering near,
> Dropt on the burning pile a pitying tear!

In the year 1794 Mr. George Saunders, architect, constructed an admirable roof, 80ft. span, at the Birmingham Theatre. The pitch was one-third of the width, and the sloping sides reached from the dripping eaves to the ridge, the common rafters being 51ft. long, supported by a pole-plate at the eaves, and five purlins reducing the bearings to something over 8ft., the uppermost being sustained by a collar-beam. Under the purlins came the principal rafters, each 35ft. long, 9in. square at the top, and 12in. deep at the foot. Straining beam at the head, 9in. × 12in., 19½ft. long without any intermediate help. Queen posts, exclusive of abutments, 9 × 9, with a straining sill 9 × 5½. The central aperture, free from all impediment, was 19ft. 6in. wide and 18ft. high. The side portions were thus formed: The length of the great rafter being divided into fourths, a raking strut was carried from the uppermost to the queen-post at about a yard from the base. In the middle or under the second purlin stood a king-post, 9 × 6, with an auxiliary rafter, 9 × 9 at the foot, and 9 × 6 at the top. Opposed to this was a strut, 9 × 6, reaching the great queen-post at about 1ft. from the bottom. From near the first purlin a strut extended to the base of the king-post. Thus the great rafter was stiffened at every quarter of its length, and the tie-beam, 15 × 15, had four points of suspension. The trusses are 10ft. apart. Compared with the Drury-lane roof this has less accommodation, but it saves the upper story of the walls, and has neither parapets nor inner gutters. There seems, indeed, the natural subordination of a provincial house to one in the capital, where space is of greater value, and every edifice must be complete and self-contained.

It may be noticed that, although in stone architecture, where the blocks of the entablature reach only from one abacus to the other, every column bears an equal portion of the load, but when a plank or piece of timber rides continuously over several supports the weight is very unequally distributed. The boards of a floor resting on many joists, the common rafters reaching over several purlins, the tie-beam held up at several points of suspension are familiar instances. The relative stress in hundredths is computed for two ends and one intermediate support 20 + 60 + 20 = 100.

For two ends and two intermediate supports 13 + 37 + 37 + 13 = 100.

For two ends and three intermediate supports 10 + 28 + 24 + 28 + 10 = 100.

For two ends and four intermediate supports 8 + 23 + 19 + 19 + 23 + 8 = 100.

A method of computing the strains of the several parts of a frame by Maxwell's "Diagrams of Stress" was explained at the Institute of Architects, by Captain Seddon, R.E., April 22, 1872, and is printed in the "Transactions."

Collections of roof designs generally exhibit a great proportion of failures, or display examples so defective in form and arrangement as to make failure the only consistent result. It would be invidious to specify instances, but they are frequent where loads have been wrongly estimated, the nature of materials imperfectly understood, or their powers injudiciously applied. But internationally considered, the modern carpentry of Great Britain seems entitled to a favourable place, conceding always that we have made no stupendous effort to parallel the Imperial Riding-house at Moscow, and that our praise is due rather to economy than art. The artistic treatment of carpentry is very dependent on the rank assigned to it in ecclesiastical edifices, and from these it may be said to have been banished for the almost exact term of three centuries. When ceilings came into use the framework was no longer apparent, and the attributes of beauty were wholly ignored. A level tie-beam was a leading canon of security under the Commissioners for Building New Churches, whose functions ceased at the death of their surveyor some thirty years ago, and architects have since been free to devise church roofs on the principles of their mediæval ancestors. Secular edifices had not been similarly debarred, but they were largely influenced by the change, and an incentive was given to the Gothic revival.

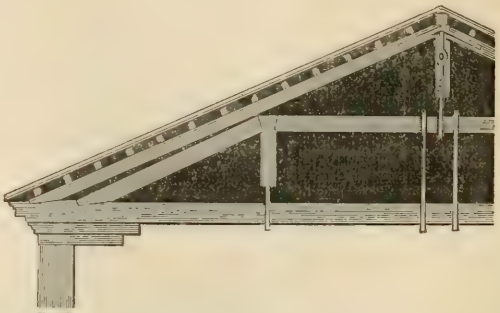


Fig. 5.

The work of Mr. Price, published in 1753,

has a remarkable series of designs for roofs, considering the date at which they were made. They are of moderate pitch, or from eaves to ridge about a fourth of the span. In every case there is a level collar from side to side, at about the middle of rafters, and from this collar sloping ties (of wood) are carried to, and connected with, the rafter feet. The chief variation in the framing occurs in the triangle above the collar. In the first it is void, and the ties meet at the middle; in the second a king-post and two struts, the ties again meeting in the middle. In the third there are queen-posts, strainer and king-post over, the ties starting from beneath the queens. The fourth has a king-post reaching from collar to ridge with struts, and short queen-posts from beneath which the ties also start. Their lines are strikingly similar, indeed, to many examples in iron a century later.

As an economic auxiliary in the construction of roofs wrought iron has recently asserted very powerful claims, but in the early stages of its application the effect produced was one of utter poverty and repulsiveness. Slowly, however, it has acquired a more tolerable and presentable character, that has rendered it worthy of architectural adoption. Accustomed to the forms of wooden roofs the eye is apt to be unsatisfied with the cobweb lines of iron substitutes that, if allowable for temporary and commonplace constructions, are little fit for works of permanence and taste. Yet tubes, that would certainly be more effective, do not appear to be much used, and effort may rather be directed to the employment of the metal in its normal form, but with greater intricacy of design and attenuation of detail than has been attainable in wood. To such an application the metal lends itself most readily, and it seems especially to invite display in the triangular divisions of Gothic character. Iron and timber admit constructive combinations, and lighter substances may be decoratively employed. In exemplification of such impressions Fig. 7 is suggestively presented, and it is, of course, assumed that the sloping ceiling would be suitably decorated.

With consciousness of the imperfect manner in which a large subject has been treated I bring these chapters to a close. One aim has been to avoid every needless break of text. The reader has been stopped by no equational impediments; the first he meets is also the last, and the terms are in direct sequence and proportion—*e.g.*, Q. E. = D. Here Q., representing the modicum of imparted information, multiplied into E.—his own enlightened apprehension—yields D., my amplified return.

THOMAS MORRIS.

Fig. 6.

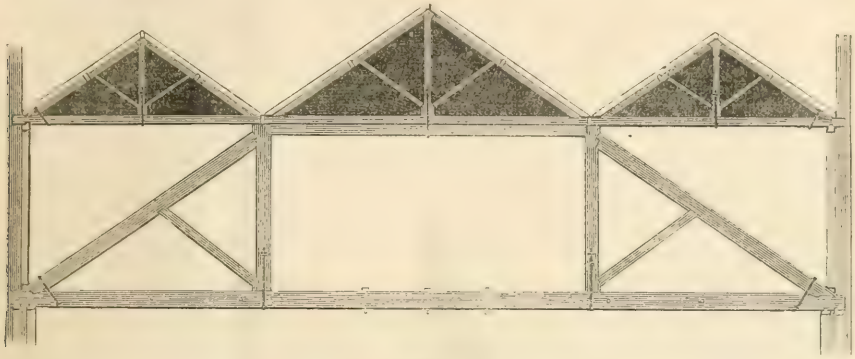
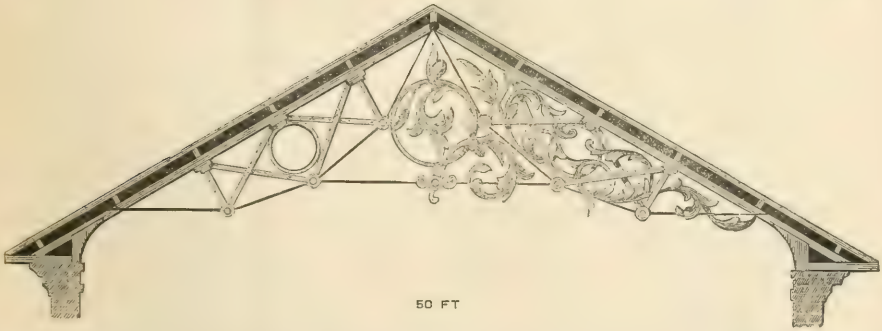


Fig. 7.



AMERICAN JERRY BUILDERS.*

THE real culprit who is primarily responsible for the presence of sewer gas in so many modern dwellings is the "speculative"—or as he is called in England the "Jerry"—builder. It is only of late years that this individual has fully developed his remarkable power of mischief, and the public are just beginning to reap the ripe crop of evils which he has sown broadcast through the land.

By the term "speculative builders" is not meant capitalists who build houses on speculation, and who, having a reputation to sustain, build durably and well. The former class are wholly irresponsible. They employ borrowed capital, and devote themselves exclusively to what are known in the trade as "skin jobs." Lacking technical training, and having little (if any) education, their knowledge is confined to a mastery of the methods of how to humbug the public. Like Peter Pindar's pedlar, they make things only to sell, and care nothing for consequences.

There are a herd of these men in all our large cities, and they swarm in England as well. The bulk of the dwellings in New York, Boston, Philadelphia, Chicago, and Cincinnati, not to extend the list, are the work of their hands.

They are not bad-looking houses as a rule, but being built to attract the eye, the greatest attention is paid to appearances. Outwardly they have every semblance of first-class dwellings, but the unfortunate tenant or purchaser soon learns their true character. Usually they are mere shells, hastily run up, and of cheap, unseasoned materials. The walls soon sink and crack. The plaster flakes off; the woodwork warps, doors sag, sashes stick, roofs leak, chimneys choke, and general deterioration follows. Within a year repairs are necessary, and once begun they soon become chronic. Yet no amount of outlay will result in more than a mere patchwork, and the whole structure may be summed up in the apt trade phrase, "cheap and diphtheria."

In these houses the greatest licence is taken with the requirements for health and safety. The building and fire department regulations are skilfully evaded, while, as we have not yet reached the point of enforcing a proper standard of workmanship and material in plumbing, the latter is neglected in the most criminal manner. Soil-pipes will be left without any sewer connection, or they may be fairly honeycombed with holes from flaws in casting; light-weight traps will be used; joints made with putty instead of lead or cement, and proper ventilation and traps will be conspicuously lacking. Yet such of the plumbing fixtures as are not hidden beneath floors and in dark corners may be handsome, if not elegant, with marble-topped basins, silver-plated faucets, and other luxuries calculated to give the impression that everything is solid and complete.

The number of such dwellings in New York and its vicinity must be reckoned by thousands. Mr. Baxter, the self-styled "architect" who planned the notorious Buddensick houses in East 52nd-street, testified in open court that during thirty years he had designed about *five thousand* houses, of which over 500 were in New York, including about 80 or 90 for Mr. Buddensick. As he declared that the plumbing in the

* Paper read, Sept. 12, by CHAS. F. WINGATE, before the New York Public Health Association.

latter houses was "fair when the style of work was considered," it may be inferred what was his standard of excellence. The entire upper part of Manhattan Island above 34th-street is packed with the work of the speculative builder. In Boston a late examination by the Board of Health of the sanitary condition of 345 specimen houses, in all parts of the city, showed that 198 had defective drains, 205 had soil-pipes without ventilation, 110 had damp or wet cellars, and 275 were without effective traps. In Brooklyn, out of 37 houses in which contagious diseases occurred a short time since, 33 had defective plumbing. Indeed, it is safe to say that two-thirds of the new dwellings in all our leading cities have been built on "speculation," and the majority of the readers of this article probably live in such dwellings.

The thousands of complaints made to the Metropolitan Board of Health by citizens of sanitary defects in their houses, and which are verified by competent inspectors, are a fair indication of the condition of the average New York house.

Most, if not all, the flagrant cases of bad plumbing reported by the press have been found in houses of the class just named, and the end is not yet. Unless some radical and sweeping reform is begun no one can estimate the consequences which must inevitably follow from their criminally defective condition.

The safety of the whole community is threatened by these imperfections, and, worst of all, so insidious and lasting are the evils which follow bad drainage and poisonous air in habitations, that future generations must share a portion of the appalling misery and pain which the Buddensick class of builders have laid in store for the community.

Were Paley's style of logic still admissible, we might demonstrate from the evidence of design that the speculative builder was the veritable personal devil of the theologians, for it would be hard to parallel the direful results of his labours. But he has "the conscience of a contractor," and cares naught for what happens after he gets his money.

It is marvellous how the average speculative builder continues to exist. He seldom has any means, and frequently is a bankrupt. Credit, in the usual sense of the term, he wholly lacks, and he would not be trusted to the extent of ten dollars in an ordinary business transaction. In the words of a lamenting admirer "too often his only capital is his heroism and his enterprise." Yet such men undertake and carry on colossal building schemes, and find no trouble in getting all the capital and support necessary to do so. Quite lately a prominent New York builder failed for 1,500,000 dols., with nominal assets of 150,000 dols.—actually about one-fourth that amount; and scores of others have shown a similar disproportion between their apparent and real resources.

Their peculiar mode of procedure is thus described: A builder contracts with a capitalist to purchase through the latter one or more city lots at a fixed profit of from 25 to 100 per cent., on which he agrees to build, provided the capitalist advances one-half the cost of the improvement as a loan. The lot value, profit and loan, are all secured by mortgage. The builder immediately "conveys" a goodly portion of the loan to his private use, and supplies the deficiency by issuing notes. He contracts with masons and other mechanics to supply material and begin the work of building. As the original loan is sufficient to pay the cost of construction these sub-contractors feel secure of pay, and eagerly bid for the work. First payments and some wages are needed to start the enterprise, but soon the set purpose of the builder is evident—to pay out as little money as possible. Notes are substituted for cash, and are renewed and extended indefinitely. The sub-contractors being obliged to complete their work before they are entitled to the benefit of the lien law, this gives the builder almost despotic control over them. They are fortunate if the buildings are completed at all. Often a dead-lock ensues, and the capitalist is induced to discount future payments by plausible pleas or a fat bonus. If the building is finished it is placed on the market, and by dexterous management sold "on easy terms." In that case the builder is in pocket and begins a new speculation of the same kind. But if the building fails to meet with a ready sale, the capitalist forecloses the mortgage in default of interest payments, or for some other cause, and appropriates the property himself. This leaves the builder with a fair stock of money from the unexpended portion of the loan, while the sub-contractors and mechanics are compelled to whistle for their dues, having been cut out of their liens by the priority of the capitalist's claim.

The party playing the rôle of capitalist not infrequently being an officer of a savings bank or insurance company is enabled to impose the whole risk and burden of the transaction upon the company, while he, or the ring he represents, pockets the exorbitant profit. The consequences involve the ruin of scores of innocent creditors, and lend to unhealthy speculation its strongest stimulus. Block after block of houses are now denominated "graveyards," because they are the mausoleums of buried capital, skill, and character. The decrees of courts absolve the titles from impediments, and the unconscious occupant builds his home around the spot that marks disaster and dishonour.

But the palmy days of the speculative builder are past. Savings banks and trust companies no longer proffer him loans. His credit, like his occupation, is gone. His chief allies in his nefarious schemes have been blighted by exposure, and are languishing behind prison bars, or have fled the country, loaded with the imprecations of the widows and orphans whose scant savings they have stolen. Meantime the public is becoming alive to the need of greater care in selecting dwellings, and is less disposed to take things for granted in sanitary matters.

This changed condition of things must bring about good results. What is still wanting, though vitally necessary, is a system of competent inspection of dwelling-houses, and the enforcement of requirements for the protection of health similar to those for security against fire and accidents. When this is accomplished a new era will have dawned, and a very sensible check will be imposed upon the mortality of the metropolis.

A YEAR'S BUILDING OPERATIONS IN OXFORD.

FOR many years past the *Oxford Journal* has given, at the close of the long vacation, a summary of the principal improvements and alterations that have been made in the University buildings and the city during the past twelvemonth. We condense from the issue of Saturday the following:—

At Christchurch College, to begin with the University, the walls of the new bell tower have been completed, and the scaffolding partly removed. Images of an angel and the Virgin Mary have been fixed in niches on the N.W. angle turret, and the cathedral clock is now set going inside the new stone casing. In Tom Quad the whole of the granite paving has been removed, while the restoration of the stonework of the buildings is now completed, and gives to the quadrangle quite a new appearance. Stone buttresses have been raised around the quadrangle, the whole of the above work having been executed by Messrs. Symm and Co., of Oxford, who have also erected a line of posts and railings along the St. Aldate's-street front of the Society. Mr. G. Hill, of High-street, executed the plumbing, and Messrs. Wyatt have made considerable internal improvements in the residence of Archdeacon Palmer. At All Souls' College a new wainscot oak screen, with ornamental lead and glass and carved work, has been erected from the designs of Mr. H. G. Tollit, by Messrs. Wyatt, by whom new stone slating has been placed on the college outbuildings. The same firm of builders have constructed a strong room and added lead windows to undergrads' library at Baliol College. The new dining-hall was opened on 16th Jan. The new dining-hall and library at Keble College were opened on St. Mark's-day; both were designed by Mr. Butterfield and built by Messrs. Parnell, of Rugby. At University College Messrs. Symm and Co. have inserted new stone in several windows in the large quadrangle and on the south side of the small quad; a new house for the master is in course of erection in Logic-lane, Mr. Fitzwilliam being the clerk of works here as well as at Christchurch. Messrs. Wyatt have added bookcases to Brasenose College library, and new stone chimneys to the common room: the same firm have executed drainage work in the fellows' garden at St. John's College, a new lecture-room at Wadham College, fresh accommodation for servants, alterations to rooms at Queen's College, and a remodelling of entrance gates, new boiler for heating apparatus, and alterations to provost's house at Worcester College. The bay window of the dining-hall of Jesus College has been restored by Messrs. Wyatt in Bath stone; the old seats and work have been removed to the antechapel, a new oak surbase has been put in, the screen has been repaired, the walls stuccoed, &c. At Oriel College Westmoreland slates have replaced the Stonesfield, and the front of the college is being restored by Mr. Hobdell. At Merton Messrs. Fisher and Hobdell have carried out several works of restoration. At the University Museum Messrs. Symm and Co. have erected a two-story building as an addition to the chemical department. The building is in a line with the front of the museum, and is on the south side; it is 134ft. by 24ft. in depth, and has been erected from the designs of Mr. Deane, of Dublin. A new lecture-room and library of Bath stone and Suffolk brick have been added to the Observatory in the Parks, erected in a style corresponding with the rest of the building. The astronomical department has also been extended; the builders are Symm and Co., of Oxford. Extensive restorations are taking place at the Bodleian Library, the building being refaced and pinnacles reinstated; the work is being carried out by Messrs. Symm and Co. At the Radcliffe Library Messrs. Symm and Co. have made considerable improvements in the reading-room. The Examination Schools, on the site of the old Angel Hotel, in the High-street, have made considerable progress during the past twelve months, from the designs of Mr. T. G. Jackson. The building will be warmed and ventilated on Haden's principle. The contract for the building has been taken by Mr. E. Estcourt, of Gloucester. A new debating-hall is being erected for the Union Society by Messrs. Parnell, of Rugby. It will be 70ft. by 40ft., with a height of 32ft., and a gallery will surround all four sides, approached by a stone staircase. The material is red brick, with terra-cotta dressings in the gallery; the ceiling will be covered with pitch-pine beams and mouldings, and the roof will be covered with Broseley tiles. It is from the designs of Mr. Waterhouse, A.R.A.

Turning to work in the city, most of the connections of house-drains with the new sewer have been made during the past year. As to the pumping and utilisation of sewage the engine, boiler-houses, and other buildings at Littlemore pumping station, are partially erected, and the site raised to nearly the required height above flood level by material dredged from the river. The engine, boilers, and pumps, the contract for which is in the hands of the North Moor Foundry Company, Oldham, will shortly be erected. The land selected for purchase by the Oxford Local Board has now come into their possession. The total quantity is 369 acres, of which an area of 33 acres, lying on the northern side of the Thame and Aylesbury railway, and extending to the village of Littlemore, is let off on lease. The other portion is being prepared for sewage irrigation, the following works being in progress:—A complete system of subsoil drainage, and deepening and straightening the water-courses, levelling the surfaces, constructing roads and bridges to connect the parts formerly in detached holdings, without any direct communication with each other; forming main carriers; laying cast-iron pipes to convey the sewage to the higher points for distribution in detail. About 20 acres of the most porous land is being laid out as a filtration area. The special preparation of this portion consists of deeper and closer subsoil drainage, and the arrangements of the surface in a series of levels formed in ridge and furrow, so that (cultivation not being the primary object) each level may be flooded several inches in depth at one time, while all surface overflow is prevented, and the sewage made to pass through a filtering medium 6ft. or 7ft. thick to the under drains, by means of which the clarified liquid will ultimately pass downwards to the river.

In Queen-street a handsome range of buildings have been erected for Messrs. Hyde and Co., outfitters, at a cost of about £9,000. The front is of red Mansfield and Bath stone, the rear brick, supported by Oxford yards. Mr. F. Codd was the architect, and Messrs. Symm and Co. the builders. Commodious warehouses of brick and Bath stone have been added to Messrs. Grimbly and Hughes' establishment in Corn Market-street from the designs of Mr. Wilkinson. The builders were Messrs. Symm and Co. Ship-street has been widened by the setting-back of the churchyard of St. Michael's Church. The wall has been replaced by iron railings. Mr. Bruton was the architect, and Mr. Hobdell the contractor. At the bottom of Rose-place, Iffley-road, a Queen Anne residence has been erected for Mr. A. G. Vernon-Harcourt. Mr. Castle is the builder. The ground on the north side of St. Giles's Church has been lowered about 2½ft., and a new wall formed. The nave and chancel of the church have been laid with tesselated tiling. Messrs. Symm and Co. were entrusted with the work. At the Clarendon press a new machine-room, 80ft. by 76ft. in the clear, is being erected by Mr. G. J. Castle on the S.E. of the Bible side. It is uniform in character with the older buildings. A new set of stables have been built near "Joe Pullin's Tree," Headington-hill, for Mr. G. H. Morrell, and are considered some of the best stables in the county. Accommodation is furnished for 17 horses, and there are ten coach-houses, harness-rooms, &c., with buildings for coachmen and grooms. A handsome bridge connects the old and Knapp portions of the estate, and this is also the work of Mr. Castle.

Amongst the improvements effected by the local board may be noted repitching of the streets, the drainage works being left an unpleasant legacy in this respect—the taking over of more than three-quarters of a mile of private streets—chiefly in New Hincksley, and another mile of streets on the Walton Manor estates of St. John's College. The most important street-widening is that at King Edward-street, where the urban authority was liberally met by Oriel College. A very important work has been the strengthening and repair of Magdalen-bridge, carried out under the engineer's and surveyor's direction in May and June last.

A SANITARY BUILDING IN OXFORD-STREET.

THOUGH many of our large business premises can boast of the latest artistic fashion in fittings and furniture, we seldom find them so perfect in hygienic arrangements as we could wish. Mr. R. Helbronner, of 137 and 138, Oxford-street, the well-known decorator, has set a good example in carrying out in his new building some important improvements in lighting, ventilation, and fittings that deserve notice. As regards the lighting of the basement devoted to storage, &c., the usual glazed pavement lights have been discarded and plain iron-bar gratings introduced; but instead of the bars being fixed vertically in the frames, they are set slantwise at an angle, so as to throw the light into the windows, while avoiding the inconvenience of allowing those who stand upon them from looking directly downwards, or those in the area below upwards. By thus disposing of the bars, which are placed parallel to the line of frontage, the advantage of thick opaque glass is secured, with the additional advantage of providing a free ingress of air to the basement and the best means of ventilation. One of the drawbacks of the hexagonal glass pavement lights is that no air can pass through, and in hot weather basement stories have been found insufferably close and hot—an evil which those working below have complained of. Indeed, in many cases we find that some of the hexagon panes have been taken out near the building. People have doubtless thought this was the result of accident or breakage, but the object has been to afford air. Both air and light are essential, and by placing the bars of the grating in the Venetian blind fashion, these combined objects have been secured without the one obvious disadvantage of the common open grating in street pavements. Going below we found the basement, nearly 90ft. in depth, perfectly ventilated and well lighted. The grating opens on hinges in lengths. The whole of the basement floor is concreted and asphalted, and the stoves are close and recessed, so as to avoid risk of fire. To throw in additional light the window frames in front are carried up above the pavement level and protected by a perforated grating below the shop window. In the front area we observe enamelled white tiles are used to reflect light, and we notice at one corner a lever tap of French construction to prevent waste, which acts by simply pressing the lever down when water is drawn, the lever instantly rising and resuming its former position when the pressure is taken off. For the use of those employed on the premises, and for the transit of goods, a safety lift (Davis's) traverses the building from the basement upwards. One of the chief things that struck us on the ground or shop floor is a side passage, divided from the shop by a glazed partition, along which runs a sideboard with opening sashes, so that travellers and others on business may communicate with the attendants without entering the shop. Here we find equal attention has been paid to sanitary details. Near the ceiling ventilating openings are provided, which communicate with air flues in the thickness of walls. The peculiar funnel-like shape of these ventilators, which diminish to a mere slit of an inch wide on the inner side, is found to prevent a down draught and to increase the force of current of vitiated air into the flue. At the back of this shop is a raised lantern skylight, in five cants, the top being ceiled, and here we notice ventilators of similar kind have been introduced between the upper and lower lights. By this combined arrangement ventilation and a quiet light are secured at the back part of the shop. The mahogany fittings for goods are ingenious. Instead of drawers and doors, which take up room behind the counter, every door is made to slide inwards out of the way, and flush with the framing—a decided improvement on the old plan. Ascending to the upper floors, devoted to silk embroidery ecclesiastical work, and other kinds of textile fabrics, we observe some very unique cases or chimney-piece fittings of the "Queen Anne" design, simple and quiet in treatment, and of excellent workmanship. One in the carpet and stuff room also struck us. On the upper floors lavatories are provided in the passages, and the kitchen, which is on the top floor, is furnished with a capital American cooking stove, in which the processes of stewing, baking, &c., can be simultaneously carried on. We note that all the ordinary chimney-pieces are of iron (bronzed) and in keeping with the character of the style; the door knobs, gas brackets, and other fittings throughout are in good taste. Even the fan-lights over the shop doors are provided with side cheeks, hinged so as to retain them open at a certain angle without the discomfort of draught at the sides. The premises of Mr. Helbronner are certainly worth a visit, as showing an improvement upon the ordinary interior appointments of business houses. We believe Mr. Helbronner has planned and carried out most of them himself.

A CHINESE SNUFF BOTTLE COLLECTION.

A CHINESE collection is always an interesting exhibition of ingenuity, and a snuff-bottle display is at least unique. The Liverpool Art Club, so indefatigable in bringing together works of art, have now on view a very choice collection of Chinese snuff bottles, and other articles in porcelain, enamel, and ivory, lent by W. Bragge, Esq., F.S.A., of Shirle Hill, Birmingham. The catalogue before us gives an idea of the immense variety of enamelled, metal, amber, Chinese porcelain, glass, rock crystal, ivory, and pearl bottles. Snuff taking, it would appear, is a custom largely prevailing in China and other nations, and artists have fer two centuries past lavished the resources of their art upon the snuff-box. Six hundred specimens at the club in Myrtle-street, Liverpool, are sufficient evidence of the ingenuity, art, and skill of the Chinese as workers in ivory, glass, and enamel. An introduction, written by the lender, Mr. Bragge, informs the reader that none of these bottles can claim a higher antiquity than the end of the 16th century, when tobacco was introduced; that in 1641 "its use had become so general, and was so obnoxious to the Emperor Tsung Ching, that he issued a prohibitory edict with much the same result as was produced by the famous 'Counterblaste' of our own King James (1604)." Mr. Bragge says, for elegance of form and beauty of decoration and colour, many of the specimens of porcelain and jasper-ware are equal to anything which Wedgwood ever produced. The enamelled snuff-bottles include cylindrical, globular, flat, oval, and oblong shapes; the decoration consisting of flowers, animals, geometrical figures, &c., upon blue grounds. The stoppers are of exquisite workmanship, and are of different materials—metal, green jade, &c. The metal bottles are very few, and these are of silver chased and pierced, silver and wood, &c. We find the porcelain bottles the most numerous, numbering 222 in all, and comprising perforated, flat, oval, round, flattened, cylindrical, gourd-shaped, globular, and square forms. The ornament consists chiefly of relievo, painted, pierced, chequered, arabesque, and other figures and devices; and the colours are various. The variegated glass bottles nearly equal the Venetian manufacture—some are cut as cameos upon glass of two colours. The exhibition also includes some choice specimens of Italian carved wood furniture of the 15th and 16th centuries, and the collection will be found interesting to admirers of art and tobacco.

MR. G. E. STREET AND SIR EDMUND BECKETT.

WITH reference to some statements which appeared in a recent number of the *Athenæum*, to which we alluded in a paragraph which appeared on p. 359, the following letter from Mr. Street has appeared in that journal:—

"I have neither restored nor ever even seen the churches at Worth and Langton Matravers with atrocities at which I am credited. I never 'restool' old stonework, and never did so. I detest the practice as much as you can, and have protested against it strongly enough and often enough to convince people who know me that I should not be guilty of the practice myself. Sir E. Beckett has not taken my place at York Minster, of which I am still in charge, and I hope likely to be. Last year I attended, as I usually did, the meeting of the Committee of the York Diocesan Church Building Society, and advised them as to the plans which came before them for grants. After I had left the room, the Archbishop, whose officer I had been for several years, seems to have moved a resolution abolishing my office, without a word of notice to any one, after which he moved a vote of thanks to me for my services, regretting that the society could no longer pay my fee for examining plans. His Grace forgot to tell me that he was going to propose any such resolution. The society, of course, was not aware of this. Soon after he seems to have put Sir E. Beckett in the office which I held, upon the understanding, I presume, that his valuable services were to be given gratuitously. The Archbishop has, however, nothing to do with the Minster. As to the restoration in progress at York, permit me to assure you that if I had not rebuilt the clerestory of the south transept it would have fallen, and that much of the external stonework was so effectually tooled and re-dressed many years ago that in parts hardly any untouched work of the original external stonework remained. By care and great pains we can find the original mouldings almost everywhere, and these I am substituting for the bad copies of an ignorant period. To those who do not value our matchless English mouldings such a work may be repugnant; to me I confess it is one of the very greatest interest; and just as I have had the satisfaction of restoring to view the interior of the exquisite south transept at York in its old state, so I hope in due time to complete the work on which I am now engaged on the exterior. We have no finer or more classical work in England than the transepts of York Minster, and I am not a little proud to have a hand in exposing them to view again in their old state, minus whitewash and modern alterations."

A new Roman Catholic memorial church is to be erected at Smethwick, near Birmingham, from designs by Mr. John Hall Gibbons, architect, 14, Ann-street, Birmingham.

At Hammersmith Police-court, on Wednesday, Francis Swinford, builder, was fined 40s., and 10s. 6d. costs, for building two houses without giving notice or sending in plans to the Chiswick Improvement Commissioners. The defendant pleaded that Mr. E. Tomlinson, the son of one of the commissioners, prepared the plans, and had promised to deposit them with Mr. Smith, the surveyor for Chiswick. The police magistrate suggested to defendant that he could sue Mr. Tomlinson for the alleged neglect.

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INSTITUTION FOR THE EDUCATION OF THE DAUGHTERS OF MISSIONARIES, SEVENOAKS—PRIVATE CHAPEL, TYNTESFIELD, NEAR BRISTOL—TIPPERARY TOWN HALL—SECOND PREMIATED DESIGN FOR THE DUBLIN CITY MARKETS.

OUR LITHOGRAPHIC ILLUSTRATIONS.

INSTITUTION FOR THE EDUCATION OF THE DAUGHTERS OF MISSIONARIES, SEVENOAKS.

This institution has been for many years located at Walthamstow, but the committee recently decided that a new building should be erected on a site which has been selected and purchased, overlooking Knowle-park, at Sevenoaks, Kent. The preparation of the designs and drawings of the proposed building were entrusted to Mr. E. C. Robins, F.S.A., of 14, John-street, Adelphi. The main building is in the form of a quadrangle, on the north side of which are the domestic offices, two stories in height, on the west side is the senior school, and on the east the junior school. On the south side, being the principal front (shown in our illustration) are the reception-rooms, library, and class-rooms, These three sides are three story buildings, the two upper stories being devoted to dormitories, some of which are divided into separate cubicles similar to Milton Mount College, Gravesend, which was designed by the same architect. The internal court is divided by a single story building from north to south. This building is the dining hall and meeting room, and is entered from the south corridor immediately opposite the principal entrance, and is served from the north corridor opposite the kitchen. Parallel with the east and west corridors are the lavatories and w.c. and cloak-rooms, lined with cloak closets. These also encroach on the internal open court already intersected by the dining hall. Simplicity of arrangement and design has been sought, combined with every necessary convenience, the dining hall and the entrance hall and waiting room being the only portions to which any attempt at ornamentation has been admitted. The whole of the foundations up to the damp-course, and all the drains and water-courses and tanks have been constructed by Messrs. Punnett and Son, who are now engaged on the lodge. Estimates are about to be obtained for the completion of the building by instalments as the funds accrue. There is to be a detached building for an infirmary, and also laundry buildings and other offices, and a covered playground surrounding the kitchen court on the north side of the building. The accommodation is limited to 100 girls, the present 60 being first provided for that the old building and grounds may be disposed of.

PRIVATE CHAPEL, TYNTESFIELD.

This chapel is attached to the residence of the late William Gibbs, Esq., the munificent founder of the chapel of Keble College, Oxford, which was being erected at the same time as the subject of the present illustration. Owing to the position of the house and the nature of the ground it was found impossible so to place the chapel that it might be entered from the ground floor. It is, therefore, built on the side of rapidly rising ground at the back of the mansion, the chapel floor being slightly higher than the first floor of the house, with which it is connected by a covered bridge or corridor; thus without any great internal height the chapel becomes externally the principal feature of the house. It is built of the local redstone, hammer-dressed with bands of Ham-hill stone and dressings of Box Ground. Internally the whole is of Corsham Down stone. The detached shafts and the steps are of Devonshire marble. The pavement, by Messrs. Powell and Sons, of Whitefriars, is a mosaic composed partly of marble and Mexican onyx, and partly of a vitreous material made by them, in which colours can be obtained, which are not found in any marbles. The whole of the windows are filled with stained glass, also by Messrs. Powell. The screen wall shown in the view is surmounted by a low wrought-iron grille, and gates executed by Lever, of Maidenhead, who also made the gas coronæ and the eagle lectern in brass. The ironwork of the doors is by Messrs. Hart, Son, and Peard. Since the drawing was made from which the illustration is taken, the chapel has been completed by filling the panels of the arcading in the apse with mosaics, executed by Salviati and Co., from cartoons prepared under the architect's direction by Messrs. Heaton, Butler, and Bayne, who have also decorated the ceiling in a simple manner, the colours employed being confined to gold, grey, and white. The contractor employed was Mr. Booth. The carving was executed by Mr. Forsyth. The chapel is seated with specially designed prie-dieu chairs made by Mr. Booth. There is an organ gallery at the west end over a small groined ante-chapel, in which is placed the organ by Messrs. Hill and Son.

TIPPERARY TOWN HALL.

This new hall was built last year for the town of Tipperary, at the expense of A. H. Smith Barry, Esq., of Marbury Hall, Northwich, and from the designs of T. G. Jackson, Esq., of London. Internally there is a fine lofty hall for public meetings, with two staircases conveniently arranged and connecting with side rooms and dressing-rooms. Below the hall is a commodious committee-room, which can be converted wthout trouble into a refreshment-room during balls, concerts, &c. The main feature of the outside is the elaborately-designed red terra-cotta dressings, with rough-cast wall spaces, enriched with decoration in sgraffito, the whole forming a pleasing composition of colour. In connection with the main building are other offices, the chief one being for the accommodation of the town fire-engine.

SECOND PREMIATED DESIGN FOR THE DUBLIN CITY MARKETS.

We reviewed this competition in the Building News of June 7 and 14, 1878, and spoke favourably on p. 594 of our last volume of the design which we now illustrate, and which, submitted by Messrs. O'Neill and Byrne, secured the second award. The estimated cost of the design was about £80,000, and the plan and design are good, and sensibly worked out.

CATHOLIC CHURCH, TEMPLEMORE.

This church, which we illustrated in the Building News of Oct. 4, but in error inserted with it a description of another church of a somewhat similar name and built by the same architect, is being erected on an elevated site given by Sir John Carden, Bart. The tower faces the road from the military barracks, which stands at the other end of the town. The internal dimensions of the building are:—nave, 26ft. × 100ft.; north and south aisles, 13ft. × 70ft.; north and south transepts, 26ft. × 26ft.; chancel, 30ft. × 26ft.; side chapels, 12ft. × 13ft. The materials used are the light and dark limestone of the locality. The chancel is lighted by coupled lancets resting on detached shafts and by seven rose windows ranging with the clerestory windows, which are also circular. The nave columns have polished marble shafts—those at the angle of transepts carry engaged stone shafts from their caps, which rise to the springing of the arched ribs of roof and mark the crossing. The works are being executed by Mr. Newstead, of Fermoy, whose contract for the shell of the building, exclusive of upper part of tower and spire, is £8,100, and from the design of Mr. George C. Ashlin.

COMPETITIONS.

Kirkcaldy Harbour Extension.—At a joint meeting of the town council and harbour commission of Kirkcaldy, held on Friday, a report was read from Mr. Stevenson, C.E., Edinburgh, relative to the plans sent in in competition for the extension and improvement of the harbour. In his report the referee stated that he had no doubt that the plan submitted by Mr. Robertson, C.E., was the best of the five received, and with a few slight modifications (which Mr. Stevenson indicated) it was the best in his judgment that could be adopted. Before coming to a decision the two corporate bodies interested resolved to make inquiries of the railway company and the neighbouring owner as to the rates of carriage and waiving of rights of foreshore.

Nottingham.—As we stated last week, thirteen sets of designs have been received in competition for the Hunger Hill Board Schools on a class-room system. The board adopted the award of the committee of selection as follows:—No. 1, Messrs. Evans and Jolley, Nottingham; 2, Mr. A. H. Goodall, Nottingham; 3, Mr. G. T. Hine, Nottingham. Eleven sets of designs were sent in for Bulwell Quarry-road Schools, with the following result:—No. 1, Mr. J. W. Keating, Nottingham; 2, Mr. A. H. Goodall, Nottingham.

Shropshire Eye, Ear, and Throat Hospital.—The building committee of the above hospital have selected the design of Mr. Christopher Obee Ellison, of Liverpool, for carrying into effect. The committee met some time ago and selected the plans of five architects from the 23 designs sent in, whom they requested to slightly alter their plans (with reference to specified points of objection) for final selection. The meeting of the committee for this purpose took place last Thursday week, when three of the designs being at once excluded, close voting took place between the designs by Mr. Ellison, of Liverpool ("Liverpool") and Mr. W. B. Sanders, of Nottingham ("Chacun à son Goût"), Mr. Ellison's design being ultimately chosen by the majority of one vote. "Liverpool" is modern Gothic in style, and "Chaucun à son Goût" a very classicised specimen of the Queen Anne style. Both the plans are very good. The four unsuccessful candidates have been offered 20 guineas each for their plans.

ARCHITECTURAL ASSOCIATION.

The following is the syllabus of papers, &c., of the Architectural Association during the ensuing session:—

October 25.—Opening Conversazione.
November 8.—Address from the President (H. L. Florence, Esq.), and Reports from the various classes, &c.
November 22.—Windows, Aston Webb, Esq.
December 6.—Organs and their treatment, Somers Clark, junior, Esq.
December 20.—Discussion: Architect or Architect and Surveyor, to be opened by A. Payne, Esq.
January 17.—Not yet settled.
January 31.—Hotels and Restaurants, F. J. Francis, Esq.
February 4.—The International Congress of Architects at Paris, E. P. Spiers, Esq.
February 28.—Trimmings, E. W. Godwin, Esq.
March 14.—The Schools of St. Luke at Ghent, W. H. James Weale, Esq.
March 28.—Party Walls, The Law and the Practice, Thos. Blashill, Esq.
April 18.—Members' Soirée.
April 25.—Ancient Paris, G. H. Birch, Esq.
May 9.—Notes on Measuring Old Buildings, chiefly intended for students, J. Neale, Esq.
May 23.—Late Wrought Ironwork, W. Penstone, Esq.
June 6.—A Tour on the Continent, H. W. Pratt, Esq.

Proposed additions to the parish church, Donaghadee, co. Down, are about to be carried out from the designs of Mr. T. Hevey, architect, the expenditure being £1,200.

The Corporation of Belfast propose erecting new covered markets at the cost of £8,000, which sum they intend to take from the accumulated profits of the gasworks, also under their control.

A limited liability company is being set on foot for providing Southend-on-Sea with an aquarium, concert-hall, theatre, and assembly-rooms, reading, and smoking-rooms, &c. The designs have been prepared by Mr. Paice, of Henrietta-street, Covent-garden.

"INSTITUTION FOR THE EDUCATION OF THE DAUGHTERS OF MISSIONARIES. SEVENOAKS." Edward C. Robins Archt. 14 Tavistock St. Bedford Sq. W.C.

Photo-Lithographed & Printed by James Akerman 6 Queen Square W.C.

Private Chapel Tyntesfield nr Bristol · ARTHUR W BLOMFIELD M.A. ARCHITECT

PARIS.

THE last month of the Exhibition is half over, and still the weather continues beautifully fine, and this huge collection of industrial and art treasures is thronged by visitors, who, however superficial their examination may be, undoubtedly go home again benefited and instructed by their visit. To a foreigner not only does the Exhibition itself teach a thousand useful lessons, but an inspection of the workshops and studios of the great Parisian firms, as well as those owned by humbler workers, is interesting in the highest degree. During the past week I have been engaged—thanks to letters of introduction given me by Mr. P. Cunliffe Owen—in going the round of many of these places, and a note or two thereon, perhaps, may be jotted down with advantage.

First of all, a word or so upon the progress made at the great church of the Sacred Heart, now being built by the Jesuits upon the summit of Montmartre. The position is a most commanding one, and the view obtained therefrom of Paris and the surrounding country is superb. At present the work does not make much show. Although the building was started three years ago, the crypt is only partially up. The style of building is Romanesque, and it is being built from the designs of M. Amédie, architect, of Paris. The contractors are the well-known firm of Riffaud and Co., of Paris, who built the Russian Church in Faubourg St. Honoré, and are now rebuilding the Hotel de Ville. They have also got the contract for the new Tuileries, but have not yet started the job. They employ upwards of 5,000 hands, and have a very extensive business. The altitude of the basement of this grand church is exactly 267ft. above the level of Paris. The towers will be crowned by domes, and to the top of the bell-tower the height will be 207ft., the length of the church, 367ft., its width, 200ft., and its height to the ridge, 100ft. It is computed that it will take from 10 to 15 years to build the place, and when complete it will certainly be the best situated, as well as one of the very finest churches in Paris. The architect supplies upwards of 2,000 detail drawings, and the size of every stone is given therein. For the pits alone—*i.e.*, for the foundations under the floor-line of the crypt, 150 detail drawings, 2ft. 1in. by 1ft. 9in., have been supplied. These foundations go 111ft. beneath the crypt in question. I had the pleasure of being conducted over the works by the foreman, and found from him that the masons earned 5s. 5d. per diem for a day of ten hours, and labourers 3s. 4d. for a like time. On Saturdays they work the same time as other days, but although Sunday work is general in Paris, no one is allowed to work at this church upon that day, the Jesuits imposing a fine of 500 francs upon the contractors for every infringement of this rule. The workmen who are single men pay 12 francs a month for a room, and generally sleep two in a bed, sharing the apartment together, so that the cost to each is brought down to 6 francs a month. That gives 1s. 3d. a week—a little over 2d. a night—as the cost of lodgings, by which it will be seen that a mason earns more by half a franc in one day than enough to lodge him comfortably for a month. This is in the neighbourhood of Montmartre. Most of the stonework in France, as everybody knows, is merely bedded before fixing, then placed in place, and afterwards moulded where it stands. The Church of the Sacred Heart, however, is not being built so, but all the stones are masoned at the quarries at Château Landon, near Fontainebleau. A hard stone, quite unlike the general run of Parisian stone, is used, and is "tooled" over the face, and left finished so. These quarries do not belong to Messrs. Riffaud, the contractors, but they have a concession with the owners, and quarry and work all the stones themselves. The scaffolding is on a gigantic scale, and three travellers, with monkey-chain tackle, lift and carry all stones. There are not many men upon the works at present (less than 50), and the crypt, which will consist of 22 courses, averaging 18in. high, is scarcely half-way up. Its roof will be stone groined, as also will that of the main body of the church. I find that stonemasoning in Paris is pretty good just now, and no stonemason scarcely is out of work. There are no English-men employed, and few other foreigners, excepting Belgians, who are very numerous.

In visiting the workshops of those engaged in the making of high-class art furniture, and the studios of sculptors and carvers, one finds trade much depressed, and little or nothing doing. At one large place I went to (Beurdeley's), where less than 100 hands are seldom employed, I found hardly 50 at work; and at another (Gueret's), who consider 200 to be their usual staff, there are only 62 men now working, and these are upon short time. The wages of the cabinet-makers and joiners is from 6d. to 7d. an hour, and carvers from 8d. to 1s. 3d. for a like period. They work from 6.30 to 6.30 in summer, and 7 till 7 in winter, with an hour out for breakfast. The wages have not risen since 1867. Work being so scarce masters are quite independent of their men, for they know there are hundreds in the city who would be only too thankful to take the place of those now in the shops. Apprentices come on at 13½ to 14 years of age, and are apprenticed for 3½ years. They receive no wages. Nearly all the carving tools used are English, but these are not our best. Addis has a reputation here as in England for unrivalled tools; but his tools are difficult to procure, and the tools of Sorby, of Sheffield, and Herring, of London, are mostly in use. The tools as a rule of French workmen are inferior to our own, but much of the work turned out therewith is very beautiful.

Nearly all the oak used in Paris is of French growth, and much of it is nicely flowered and excellent working stuff. They do not as a rule dry it by artificial means, considering that by so doing they destroy the nature of the wood. The cost of oak is from 300 to 330 francs a cubic metre (1 yard 4in.), delivered at the station, Paris. Good firms, such as Fourdinois and those just mentioned, keep the stuff 15 years before using. They buy a little white oak from Holland, but very rarely. There is an immense deal of walnut used that comes from the Balkans.

An inspection of M. Henri Fourdinois' workshop is very interesting; but there, like other good shops, trade is depressed, and that gentleman—he is decorated with the Legion of Honour—told me that, whilst he averaged about 65 men generally, he now hardly knows where to find employment for his reduced staff of 25 hands.

HARRY HEMS.

Paris, October 14th, 1878.

SCHOOLS OF ART.

BIRKENHEAD.—The annual meeting and prize distribution in connection with this school took place on Tuesday evening.—Mr. John Bentley, the head-master, read his annual report, in which he stated that, notwithstanding the general depression in trade, the numbers attending the evening classes during the year had been well maintained. The aggregate number of students attending the various classes had been 265, showing a falling off of one from the previous year. In the evening classes there had been 187, and in the morning classes 78 students. At the Government examinations, 171 candidates presented themselves for examination. For the local prizes there had been a fair competition.

LEICESTER SCHOOL OF ART.—The eighth annual meeting of the subscribers to the above institution was held on Wednesday week. The annual report congratulated the subscribers on the success of the school in all its branches, but the pecuniary position of the school was (owing to the extraordinary outlay in providing the necessary fittings), not so satisfactory as the committee could have desired, the sum of £340 17s. 6d. being due to the treasurer at the close of the last financial year. Last year the Government grant amounted to £164 9s.; this year the amount claimed is £211 5s. Last year the awards in the national competition were one silver medal, one bronze medal, and two book prizes. This year the national awards are one silver medal, three bronze medals, and one book prize. In the third grade last year there were nine prizes given; this year the number has reached thirty-six, besides the prizes awarded to the advanced students.

METROPOLITAN DRAWING CLASSES.—Last week the Lord Mayor presided at a meeting of the students and friends of the Metropolitan Drawing Classes in connection with the Science and Art Department, held in the Guildhall.—Mr. Buckmaster, in a lengthy address upon the science and art education of the country, said that during the last thirteen years 5,000 students had benefitted by the teaching of Mr. Busbridge.—Mr. Busbridge next read his annual report, which stated that there were sixteen of these classes of geometrical drawings and the cognate branches in the metropolis for artisans of every class. The attendance at them had been large, and the work of the pupils had been carried on in a very creditable manner. He might mention that the classes had obtained one-fifth of the whole of the Queen's prizes awarded in the United Kingdom. It was most pleasing to find that many of the City companies were moving in the matter of technical education, and the action taken by the Corporation in this matter, he hoped, would make the science more valuable to the working classes of this great city. Since the formation of the classes, 4,958 students had attended them, and they had obtained 1,482 of the Queen's prizes awarded, in addition to 3,751 certificates. Last year the number of Queen's prizes obtained was 196, and about 600 certificates.

ARCHÆOLOGICAL.

THE TUMULI OF THE TAMWORTH DISTRICT.—On Monday week Mr. A. A. Clarson, of Tamworth, read an excellent paper on the above subject before the members of the local Natural History Society. Mr. Clarson said:—"We have close to Tamworth Brown's tumulus, Elford Low, Croxall, Seckington, Hartshill (2), Bury Hill (near Bramcote), Maxstoke (three in a group), Windmill Hill, Nether Whitacre, Cloudesley Bush, Hint's tumulus, Offlow, Bury Hill, Lichfield, and Barrow Cop Hill. There is some little doubt as to Seckington being sepulchral. It is thought, with great reason, that it is an ancient British camp, but doubt on this point will shortly be set at rest, for it is about to be opened, I understand, by the British Archæological Association. The tumulus at Elford (Elford Low) was opened by Dr. Plot in 1680. He found ashes and burnt bones, and supposes it to be Roman—a conclusion, I think, open to question. Further exploration, with our improved knowledge, might throw more light upon it. One of the Hartshill tumuli was opened in 1773. This was 75ft. in diameter at the base, 18ft. across the top, and about 12ft. high. A little lower than the level of the ground was formed a pavement of brick about 6ft. square. Axe hammer-heads have been frequently found at Hartshill, made of the green stone of the district. The specimen which I exhibit was formerly in the possession of Mr. Ludford, of Ansley Hall, and was found at the end of the last century. The pavement of brick seems to mark the Roman period, the use of brick being unknown in our country till the Roman invasion. It is quite possible that this may be a Roman-British or part-Roman grave. I must now conclude my paper with a few remarks on the remains found at Croxall. My inquiries are yet incomplete, but as far as I can learn iron swords have been found in the tumulus there. If so it would seem to fix the date as Saxon. Near this tumulus, however, a discovery was made a short time since of a British burying place. Numbers of urns containing burnt bones were found, and in one of them was also a bronze awl or pricker. Three of these urns are now in the museum at Lichfield, and I exhibit a rough sketch of them. The larger one is about 10in. in height, the others about 5in. But for the fact that it contained bones I would have said that one of them was a food vessel. The first is exactly like a type found by Greenwell in Yorkshire, and the second one is ornamented by lines composed of small dots or rather diagonal dashes, and arranged in a sort of basket pattern. You will see the resemblance to those previously shown, and it is a proof of the marvellous persistence in pattern and form of these sepulchral vessels."

A meeting of the congregation of Christ Church, Swansea, was held on Tuesday week, at which it was resolved to enlarge the church by an extension to the south, and to erect a stained glass window in memory of the founder.

ARCHITECTURAL SOCIETIES.

Glasgow Institute of Architects.—The eleventh annual general meeting of this institute was held on Tuesday, at the office of Mr. Wm. Maclean, the secretary, 196, St. Vincent-street. The chair was occupied by Mr. John Burnet, I.A., the president. Mr. Maclean read the annual report, from which it appeared that the members on the register are 49. A report on the proposed general code of building regulations was drawn up and forwarded to the Royal Institute of British Architects at their request. The council had under consideration the conditions on which Mr. W. S. Dixon invited competing designs for a town hall, &c., at Govanhill. They felt compelled to express their unqualified disapproval of these conditions as derogatory to the interests of the profession, and to recommend the members of the institute to abstain from competing. In pursuance of the resolution of the institute to give annually a gold medal for the encouragement of good draughtsmanship among the pupils and assistants of members, the drawings sent in to compete for this year's medal were publicly exhibited; and the council, after a careful examination, awarded the medal to Mr. A. J. Russell, in the office of Mr. D. M'Naughtan, for a drawing of Paisley Abbey. The president also gave a prize, consisting of five volumes on architecture, which was gained by Mr. James Robertson, in the office of Mr. J. L. Cowan. Next year the gold medal will be awarded for the best design for a library and reading-room suited for a small town. The president's prize will be given for the best series of drawings illustrating the portico of St. Andrew's Church, Glasgow. The report and recommendations of the Royal Institute of British Architects as to the position and privileges of non-metropolitan members, were considered by the council and approved of. The following gentlemen were then elected to be members of the council for the ensuing year—viz., William Forrest Salmon, Alexander Petrie, J. L. Cowan, Jas. Thomson, John Baird, John McLeod, Matthew Forsyth, Campbell Douglas, John Honeyman (R.I.B.A.), and R. A. Bryden. A meeting of the newly-elected council of management took place immediately after the general meeting of the institute, when the following office-bearers for the ensuing year were elected:—Mr. Campbell Douglas, president; Mr. James Thomson, vice-president; Mr. James Sellars, jun., treasurer; Mr. Wm. Maclean, writer, secretary; Mr. John Burnet, I.A., auditor.

Two new village Board Schools have just been completed near Rugby—one at Newbold-upon-Avon, and the other at Long Lawford. They each possess the same accommodation—viz., for 130 children. There is a mixed school, 42ft. 6in. by 18ft., with open roof, and an infants' school or class-room, 19ft. by 15ft., with separate entrances for boys and girls. There is a schoolmaster's house to each school, containing parlour, kitchen, offices, and three bedrooms. The whole has been carried out by Mr. Heap, builder, of Dunchurch, for about £1,700 for each school. Mr. James N. Crofts, of Liverpool, was the architect.

New Board Schools at Rettendon, near Battles Bridge, South Essex, were opened on Monday week. They have been built from the designs of Mr. C. Pertwee, of Chelmsford.

A new Congregational chapel at Brierfield, near Burnley, was opened on Thursday, the 10th. It is built of Marsden-cross quarries, and is 70ft. by 40ft., seating 600 persons. Beneath are school and class-rooms. Mr. Bell, of Burnley, is the architect, and Messrs. Taylor and Anson, of Burnley, are the stonemasons. The cost has been £2,500.

Mr. Sutton has been appointed architect to the School Board for Stapleton, near Nottingham.

At Stebbing, near Braintree, Essex, new Board Schools, erected just outside the village, were opened a fortnight since. The are built in a Domestic 16th century style of red brick, with high-pitched roofs, and comprise mixed school-room, class-room, infants' room, and master's house. The work has been carried out by Mr. J. Brown, contractor, of Braintree, from the designs of Mr. Lovegrove, of London, which were chosen in competition. The total cost has been £2,370, including £100 for site—between £7 and £8 per head.

The parish church of St. Dogwell's, Pembrokeshire, was reopened on Friday, after restoration of the nave, at the sole cost of the Sealy-Ham family. The chancel was rebuilt in 1872 by the Ecclesiastical Commissioners.

Building Intelligence.

Coleford.—On Wednesday week the foundation stone of a new church at Coleford was laid. The new church will be in the Gothic style, with open roof, and no tower or external ornament. The entire length of the building in the clear is 100ft. by 40ft., with the chancel 22ft. by 26ft., the latter lighted by means of two-light east windows. Messrs. Waller and Son, of Gloucester, are the architects, and Messrs. Coleman Brothers, of Chaxhill, the builders. The amount of the contract is £4,402.

Glasgow.—A commencement has been made in the erection of the new University Hall, the gift of the Marquis of Bute. When finished it will be a splendid addition to the college buildings, of which it formed a part in the original design. The hall will be 120ft. long, and nearly 70ft. wide, and the height will be about 75ft. It will be lighted by two ranges of windows on each side, and between the lights a gallery will project. The roof will be supported by iron columns, which will divide the hall into a wide central span, with side divisions; above the columns are arches of woodwork, divided by niches containing figures, and over these there will be an ornamental cornice, from which the vault of the richly-panelled roof springs. At one end of the hall will be the approach from the grand staircase, and at the other a large apartment opening into it through three arches. The hall will be elevated above the ground level by an open cloister, arcaded and vaulted throughout. At the angles will be flanking turrets, rising the full height of the walls of the hall, and finished by pyramidal roofs, and between the windows are large buttresses. The cost of the hall, as given by the Marquis of Bute, will be about £45,000, while that of the sub-story, which is being built by the University, about £218,000. The works have been commenced by Mr. John Thompson, of Peterborough, who was the contractor for the whole of the college buildings. They are under the direction of Messrs. George Gilbert and John Oldrid Scott, who have been appointed by the University to succeed their late father. Mr. Morgan is clerk of works. It is expected that the work of erection will occupy some four or five years.

Granshaw.—On Monday week the foundation stone of a new Wesleyan church was laid at Granshaw, Ireland. The style is Gothic of the fourteenth century, and the church is built externally of Scrabo stone, banded with red stone from the Dundonald quarries. All the dressings are of Dundonald red stone, chisel-dressed and moulded, and the principal features carved. The tower is placed at the south-east angle. The church will be slated with American green slates, and will accommodate 400 persons. Mr. Henry Chappell, C.E., Newtownwards, is the architect, and Mr. Hutcheson Keith, Belfast, the builder.

Loughborough.—On Tuesday week the new parish church of Holy Trinity, Loughborough, was consecrated. The new church is cruciform in shape, and of the Early English style. Accommodation has been provided for 500 adults. The walls are of Mountsorrel granite, with Bath stone dressings. There is a boarded floor under the seats, while Staffordshire tiles have been placed in the aisles. The chancel is paved with Minton tiles. The cost of the work has been about £4,700. The builder was Mr. H. C. Clipsham, of Norwell, near Newark, and the architect, Mr. Blomfield, of London.

Manchester.—A new Wesleyan chapel, situated at the corner of Heslington-street and Raby-street, Moss-lane East, Moss-side, was opened on Saturday, the 5th inst. The large room on the ground floor, which for the present will be used as a chapel, will seat 300 persons, additional accommodation for about 150 people being provided in the gallery. Adjacent to the gallery is a room intended for ladies' sewing meetings. Contiguous to the chapel are seven class-rooms, four being at the front, and three at the back, with yards and conveniences. Over the three class-rooms at the rear of the chapel is a room measuring 56ft. by 22ft. On the basement is a kitchen, fitted with a hoist to each of the upper floors, together with the heating apparatus. The whole of the woodwork of the chapel is pitch-pine, stained and varnished. The roof principals are of hammer-beam construction, and the walls and roofs are plastered. The ventilation is simple and effective. Externally the building is faced with white headers, relieved with strings of stock brick and stone dressings. The entrances to the chapel are numerous. The cost of the building will be about £3,800. The work has been executed by Mr. Wm. W. Harrison, builder, Greenheys, from the designs and under the superintendence of the architect, Mr. John Lowe, F.I.B.A., of Manchester.

Metropolitan Board of Works.—At Friday's meeting of this board a deputation was received from the vestry of St. James, Westminster, in support of a memorial asking the board's aid in the proposed incorporation of Wardour-street with part of Princes-street. The matter was referred to the works committee. That committee reported that having regard to the large amount of work now in hand in connection with eleven schemes under the Artisans' Dwellings Act, for which special Acts have been obtained, it is not desirable to take action except with reference to two areas in the parishes of St. Giles-in-the-Fields and All Saints, Poplar. In reference to this matter a deputation attended from the vestry of Greenwich, to request the board to include for immediate attention a scheme for Hughes's-fields, Deptford, which was stated to be in a highly insanitary state.—Mr. Richardson supported the memorial in a speech in which he declared that the houses in Hughes's-fields were amongst the worst in the metropolis—that many of them were old, only of wood, and unsound. No member of the board would allow a pony or a cow belonging to him to be kept in any of the hundreds of houses in this district used. As the zymotic death-rate was very high in this district, he urged the board to rescind their decision to take up at present only the two areas in St. Giles-in-the-Fields and All Saints, Poplar, and to add this to the number. A discussion ensued, in which it was said to be cruel to displace the inhabitants of the district until dwellings were provided, that the matter could not now be undertaken by the board's officials, and further that although the condition of the district was deplorable, it was not so bad as had been represented. The amendment to include Hughes's-fields with the other schemes was rejected on these grounds, by a majority of 23 to 10, and the superintending architect and engineer were instructed to proceed with the two schemes. £1,019, being about half the estimated cost, was voted towards a contemplated improvement in Devon's-road and Orwell-road, Poplar. As to the York-buildings water-gate, on the Victoria Embankment, the works committee reported that it was not desirable to take any action as to raising or opening this gateway, and their recommendation was adopted. It was agreed to lend further sums of £4,000 to the Lambeth guardians for completing the new infirmary, and of £6,500 to the Holborn guardians for the erection of a laundry at the Highgate infirmary. The Building Act Committee submitted bye-laws made under the 16th section of the Metropolis Management and Building Acts Amendment Act, 1878, with respect to the foundations and sites of buildings, and other matters; the draft bye-laws were referred back to the committee, with authority to send them to the Royal Institute of British Architects and the Institution of Surveyors, in order to ascertain the views of those bodies with respect to them before they are confirmed.

Milland Church.—By strenuous exertions in the district the present edifice, which has been distinguished in ecclesiastical reports as one of the worst and most inefficient in England, is about to be replaced by a handsome Gothic building, the foundation stone of which was laid on Saturday last in presence of the Bishop of Chichester and a large body of clergy. The ceremony was performed by Mrs. Dumford, the wife of the vicar, and great interest was evinced in the proceedings, many hundreds being present. The land for the church has been presented by Sir John Hawkshaw, and although the district is comparatively a poor one, the building fund now

amounts to £2,000, leaving about £1,000 yet to be raised to defray the cost of the intended building, which is to be erected in Bargate stone, from the designs of Mr. William C. Street, the contractor being Mr. Pink, of Godalming.

Northampton.—The new church of St. Lawrence, Northampton, was consecrated on Thursday, Oct. 10. Accommodation has been provided for 800 persons. Early English in style, the details are simple. The edifice is built of brick, both inside and out, with Bath stone dressings. The roofs are tiled with a fancy ridge, and at the north-east corner a turret rises to a height of 84ft. The entire length of the building outside is 142ft., and the width 41ft. 4in. The height is 40ft. to the wall-plate, 52ft. to the apex of the vault, and 64ft. to the ridge. There is a barrel-roof of yellow deal, panelled, and continuous from end to end. The length of the nave is 85ft., and of the choir and chancel, 36ft., the latter being divided from the aisles by means of ornamental wrought-iron screens. The north aisle is to be utilised as a chapel, being large enough to accommodate 70 or 80 persons. The choir is floored with Godwin's encaustic and coloured tiles. The cost of the entire work is £7,800. The architects were Messrs. Burder and Baker, 14, York-buildings, Adelphi, London; the contractor, Mr. John Watkin, St. George's-street; and the clerk of the works, Mr. David Young. The choir screens were by Messrs. Barnard, Bishop, and Barnard, of Norwich.

Southwark.—On Thursday week memorial stones were laid of a new Wesleyan chapel and schools about to be erected in Stamford-street, Blackfriars-road, S.E., in perpetuation of the one in Waterloo-road, acquired by refreshment contractors to the South Western Railway. The site is so circumscribed as to involve the Sunday school being arranged over a portion of the chapel, and the chief portion of the light being obtained from skylights. The greatest breadth of the building will be 40ft. 6in., and the length 47ft. 9in. The chapel will be seated for 450; the pews will be stepped, and with the passages will radiate from the pulpit. Behind the pulpit will be the organ, and facing it a gallery. The basement will be utilised as vestries. The street front of the chapel will be of white brick, with stone dressings. The cost of erection will be about £4,000. Mr. James Weir, of 67, Strand, W.C., is the architect; the builders are Messrs. J. F. Rider and Son, of Union-street, Borough.

St. Mary's Cathedral, Tuam.—The ceremony of the consecration of St. Mary's (Episcopalian) Cathedral was performed on Wednesday by the Lord Bishop of Cork, Cloyne, and Ross. About sixteen years ago the dean and chapter of that ancient church, adjoining which the present edifice has been erected, ably seconded and generously supported, commenced the structure which now stands completed in all its dignity and beauty. Constructed from plans submitted by Sir Thomas Deane, the cathedral is built in the national style of Irish architecture—of first pointed period. It contains the ancient triumphal arch erected in the twelfth century by Roderick O'Connor, the last king but one of Ireland, and is considered by some as being the one architectural specimen of the essentially native style of ornamentation now existing in Ireland. The chancel screen is modelled after the blind arcade on the western end of Castle Rising Church, Norfolk, and was presented by Lord Sligo. It is constructed of Dorset agate, marble, and porphyry—light slabs of porphyry resting on interlacing arches of marble, that are again supported by groups of pillars of porphyry, projecting for kneeling purposes. The bishop's throne is constructed of Caen stone and Irish marble, and is richly carved. The stalls, designed and presented by the lord bishop, are unique. They are constructed in Caen stone, and in front of each stands a stone desk, resting on a pillar of Irish marble, the pedestal also being of Caen stone. There is a separate desk before each stall. The choir is confined to the east of the chancel arch. The seats for the family of the bishop are also in Caen stone. The pulpit and font are constructed in Caen stone and Irish marbles. The contract for the heating of the cathedral was carried out by Messrs. Maguire and Son, of Dublin. The total outlay has been about £15,000, and the work has been 16 years in execution.

Woodstock.—The parish church of St. Mary was re-opened on Monday week, after having been almost rebuilt, in accordance with the suggestions of Mr. A. W. Blomfield, M.A. On the north side the aisle, destroyed it is believed subsequent to the Reformation, has been reconstructed, and the north gallery, which projected from the columns of the blocked-up arcade, has been removed. The south aisle has been restored, and at the same time a clerestory has been added to the nave. West and south doorways, long blocked up, have been re-opened, and the organ, which hid from view the west window, has been removed. The gallery across the chancel, formerly used by the corporation, has been swept away, and the chancel arch stalled, so as to afford a better through view. A new north chancel aisle and vestry-room have been built, partly on the site of a chantry and schoolroom. The screen dividing the nave from chancel has been restored, and a stained glass window, representing the Virgin and Child, and Our Lord bearing the cross, has been inserted on the south side of chancel. The chancel is paved with Godwin's encaustic tiles. The altar rails and gas-fittings have been supplied by Messrs. Hart and Co., and Grundy's heating apparatus has been introduced. The reredos is carved in Bath stone, and is, like the altar cloth, from Mr. Blomfield's design. The high pews have been replaced by seats facing east (instead of north and south as formerly), and now the seats accommodate 630 persons. The outlay has been about £6,400. Mr. A. Groves, of Milton-under-Wychwood, was the builder, and Mr. Buckingham the foreman.

On Wednesday week the foundation stone of a new Presbyterian church in St. Michael's-road, Landport, was laid by Mr. Gainsford Bruce, Recorder of Bradford. The church, which is being built by the Messrs. Light, will be 72ft. long by 47ft. wide, with a vestibule 27ft. by 9ft., and will accommodate upwards of 500 persons.

The enlarged chancel of Saint Andrew's Church, Montpelier, Bristol, was consecrated on Friday last. Mr. W. H. Clark is the architect, and Messrs. J. and S. R. Gorvett the builders.

A new school and teachers' house have been built and presented together with the site to the parish of Mearns, N.B., by a townsman. Mr. Smith was the architect, and Mr. Moorsman the builder. The total cost to the donor was £1,575.

At Chesterfield police-court on Monday, Mark Joel, of Stonegravels, was fined under the local byelaws 20s. and costs for letting a house and shop, his property, without having first obtained from the borough surveyor a certificate that it was in a fit and habitable state. Defendant was warned that he would be liable to a 40s. continuing fine for every day that the house was occupied, being uncertified.

The School Board for Christchurch, Monmouthshire, on Friday rescinded a contract into which they had entered with Mr. Small for the erection of a new school at Lisworry at £3,000, and instructed their architect (Mr. Goodman) to prepare fresh and less expensive plans.

New board schools were opened at Chepstow on Friday. Mr. Cuthbert Whalley was the contractor.

The village reading-room at Eversholt, Bedfordshire, was re-opened last week, having been transformed into a model village institution. Messrs. Cubitt were the contractors.

Mr. Cunningham, C.E., Edinburgh, who was recently instructed by the Marquis of Bute to report as to the means of better supplying with water the high levels of the town of Rothesay, has just made his report. In it he recommends that the water from Dhu Loch be introduced into the town by gravitation, at a cost of about £8,000. The report has been approved by the water supply committee of the town council.

A new Free Church at Cupar, N.B., which has been in course of erection during the past two years, is to be opened on the 21st prox. It has been built at a cost of £10,000, and although the exterior is plain, it is highly decorated in colour within.

The new Aveling memorial church at the Redham Asylum for fatherless children, Caterham Junction, was opened on Tuesday week. It has been built from the designs of Mr. John Salman, at a cost of £3,800, and is Gothic in character, capable of seating 350 children and 100 adults. The interior is divided into nave and aisles on a somewhat novel plan, there being only two widespread arches, and a single granite column on either side, so as to reduce the obstruction to sight and hearing to a minimum. The windows are of stained glass.

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TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.]

All letters should be addressed to the EDITOR, 31, TAVISTOCK-STREET, COVENT-GARDEN, W.C.

To our Readers.—We shall feel obliged to any of our readers who will favour us with brief notes of works contemplated or in progress in the provinces.

Cheques and Post-office Orders to be made payable to J. Passmore Edwards.

ADVERTISEMENT CHARGES.

The charge for advertisements is 6d. per line of eight words (the first line counting as two). No advertisement inserted for less than half-a-crown. Special terms for series of more than six insertions can be ascertained on application to the Publisher.

Front Page Advertisements and Paragraph Advertisements 1s. per line. No front page or paragraph Advertisement inserted for less than 5s.

Advertisements for the current week must reach the office not later than 5 p.m. on Thursday.

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Cases for binding the half-yearly volumes, 2s. each.

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Drawings Received.—Enigma.—Cyprus.—Cross in two Circles.—Maltese Cross in Circle.—M. in Leaves.—Dagger with Motto Through in Circles. — Try. — Amateur.—Chimney Pot.—Jack Spratt.—Jac.—J. in Lines. — Montague. —Black Cross.—C. in Circle.—Cymraeg.—G. T. H.—A. and H.—P. K. G.

J. T. Cartwright. (As it is A's wall B is certainly responsible for any damage to the wall of A by underpinning. The building owner is bound to give notice to the adjoining owner of his intention, and if no agreement is come to the best course is to call in an architect or surveyor. You do not say whether any notice of intention has been formally rendered, but the case is one for arbitration.)—R. M. (Your remedy is to give notice to the owner of houses, and also to the vestry or district board. We believe seven days' notice is necessary. There is no act that yet affects your case, and nearly half London is drained through other houses.)—E. (Get the last six numbers of the *English Mechanic*. You will find therein all the information to date about the electric light.)

"Building News" Designing Club.—Fred W. Leverisha. (Particulars appeared in the Building News of Sept. 20th. The first subjects have been sent in.)—J.—M.—Through and Dagger.—A. C.—Iota.—Ogmore.—A. Wakerley.

Correspondence.

OAK AND CHESNUT TIMBER.

To the Editor of the Building News.

Sir,—I hope Mr. Morris will, on reflection, see that he has practically given up the whole question in dispute. Granting as he does that the tests I give are decisive whenever a given piece of wood can be cut open, and remembering that not a single instance of the occurrence of chesnut in old English carpentry has ever been proved by this or any other means, is it reasonable that the mind of the Primate should be exercised about the nature of his roof-tree, or that he should be moved to cut into it, on the bare chance of its turning out to be something that nobody has seen before.

I confess I do not see the merits of that "individuality" which leads to opposite conclusions from the same data, or of a perpetual "harvest of controversy" about a matter which plain men who will stick to the facts can reap

once for all. Surely a continued controversy must be fed with new facts, or it will degenerate into twaddle, which, however harmless it may seem, becomes mischievous when it tends to deceive.—I am, &c., Thos. Blashill.

CHIPS.

A new cocoa-room, erected by the vicar of Rotherham, is about to be opened in that town. The building, which has cost £4,000, is from the designs of Messrs. Tacon and Rawson, of Rotherham, and Mr. Scott, of Masborough, is the builder. The heating apparatus is by Mr. R. R. Gibbs, of Liverpool.

The Swansea Corporation decided last week to call in Mr. Rawlinson, C.E., to consult with their engineer as to the condition and mode of repairing the Velindre reservoir.

A new Baptist chapel, erected at a cost (including site) of upwards of £3,000, has been recently opened at Dundee. Messrs. M'Culloch and Fairley, of Edinburgh and Dundee, were the architects.

The annual meeting of the Architectural Society of the Archdeaconries of Northampton and Oakham was held on Wednesday, October 9. Papers were read on "The Excavations at Irchester Camp," by the Rev. R. S. Baker, and on "Restorations," by Sir Henry Dryden, who also gave an interesting account of a recent visit to the dolmens of the Netherlands.

A dispute has arisen between Mr. F. Watson, architect, of Nottingham, and the Mansfield improvement commissioners, with reference to professional charges for travelling expenses, and a clerk of works. The matter was discussed at length by the commissioners on Friday—the chairman, who is the architect's brother, having retired from the meeting prior to the consideration of the subject. It was resolved to submit the matter to the Local Government Board for arbitration.

New Sunday Schools, attached to Water-street Calvinistic Methodist chapel, Carmarthen, were opened on Sunday. They are Gothic in style, and seat 400 children.

Plans have been submitted to the West Ham Local Board for a new covered market proposed to be erected so as to cover the whole of Brewer's-yard, Angel-lane. The plan stands over for improvements in the intended method of ventilation.

New business premises for the Newcastle Cab Company have been erected at Newcastle-on-Tyne. Mr. W. Lister Newcombe is the architect, and Mr. E. B. Reed the contractor.

The rearing supper to the workmen employed in the erection of the Stephenson Memorial Hall at Chesterfield was held at the County Hotel on Friday night. About 60 persons sat down. The chair was occupied by Mr. Bradbury, of the firm of Chadwick and Co., of Masborough, the contractors for the work, and the vice-chair by Mr. Hawley, the clerk of the works.

A "crematorium" is about to be added to the other curiosities of the capital by the Cremation Society of Great Britain, and it is said Mr. W. Eassie, C.E., has been instructed to erect upon it a pyre of the kind designed by Gorini, and now in use at Milan.

A new general prison for Scotland is about to be built in Renfrewshire for the Government. Mr. Stevenson, C.E., Edinburgh, and Mr. Brownlie, C.E., London, visited Greenock a short time since, and selected a plot of moorland near Auchmead Farm, as the site on which it is to be built.

The opening services of the Primitive Methodist new church and schools, King-street, Stretford, have just been concluded. The work has been executed satisfactorily by Mr. R. Gell, of Stretford, under the superintendence of the architect, Mr. Arthur Morry, St. Peter's Chambers, Manchester. The cost of the buildings, exclusive of school fittings, organ, and furniture, is £5,000.

Messrs. Longmire and Burge have received the order to proceed with the new roof for the nave of St. Alban's Cathedral of the old high pitch, according to the resolution of the meeting of subscribers two months ago, confirming the previous resolution of the faculty committee. The contractors allow the question of the covering of the roof to stand over for a few months, on account of the state of the funds. The present subscriptions will be about £2,600 short of what is requisite for flat tiles, and about £3,000 short for Coniston slates, and not enough for lead by at least £4,600, and more if the present low price of lead rises again. This includes nothing for painting the ceiling, which has to be renewed over ten bays out of the 13, but includes the restoration of so much of the parapet and cornice as is not already done under the former contract.

Mr. F. Matcham, of Rugby Chambers, Bedford-row (son-in-law of the late Mr. J. T. Robinson), has received instructions to prepare designs for the rebuilding of the Gaiety Theatre, Glasgow, for Mr. Chas. Bernard.

Intercommunication.

QUESTIONS.

[5546.]—**Conservatories.**—Will any kind friend inform me where I can get the best detailed information about conservatory work, showing the best methods of laying glass, arranging flues, &c., &c.?—D.

[5547.]—**Drainage of Cemetery.**—Can any of your correspondents inform me the best way to drain a cemetery in the country? I have tried a square drain stone 18in. square, with flag on top, to allow water to get away, but this does not answer; the bottom part is rather low.—Mortuus.

[5548.]—**Best Bangor Slates.**—An architect specifies "best Bangor slates" for a house. Has the builder fairly the option of using either "best Penrhyn or "best Port Dinorwic?"—W.

[5549.]—**Discharge of Sewers.**—Would any one of your numerous readers kindly give some proper rule for finding the discharge of sewers when the inclinations are given, both egg-shaped and circular?—Student.

[5550.]—**Brick Machine.**—Will some correspondent please kindly inform me of a machine worked by horse-power suitable for a small yard, that will make from 2,000 to 3,000 per day? All the machines I know are too large and powerful.—Brickmaker.

[5551.]—**Valuer's Licence.**—In the Building News about a fortnight ago I saw stated in answer to a correspondent "It is not necessary to have a valuer's licence in order to value house property for mortgage, &c." I shall be glad to have this subject cleared up. Some architects I know who take out licences every year, while other architects do not. What kind of valuations require to be prepared only by a licensed valuer?—J. P. O.

[5552.]—**Classical Mansion.**—I have a mansion in plain Italian or Palladian style to re-model and enlarge on a more ornamental and elaborate scale, and should be glad to know the title and name of author of any really good illustrated work upon the modern Italian style, which would be of use to me.—Alpha.

[5553.]—**Elizabethan—Italian Decorations.**—The dining-room of an Elizabethan mansion in the north, having the original stone-mullioned windows, has (about 100 years since) been fitted up internally with joiners' work and plaster cornices of a modern Italian type. It is now proposed to decorate the walls, woodwork, panelled dado, &c., in plain-painted colours. Will some one more experienced kindly tell me what colours would be most suitable, taking into consideration the original character of the structure which it is thought desirable to follow? A frieze under the cornice about 9in. wide may be a separate colour.—Cumberland.

[5554.]—**Glazing Mullioned Windows.**—It is wished to re-glaze the Elizabethan windows of a dining-room, the existing stone mullions and transoms having an ordinary glass groove. Ornamental quarries are required above the transoms, and large sheets of plate-glass below, extending the whole width (about 18in.) between the mullions. I shall be glad to know the best way to do this, the most effective treatment of the upper part, and in order to gain ventilation, whether to have posts above or below the transoms to hang in metal frames. Would metal frames be necessary for the fixed portions?—Half-Fledged.

[5555.]—**Cost of Sawing and Waste of Timber.**—If sawing cost 4s. per 100ft. super, how much per cubic foot will the probable cost be for such timbers as roofing, partition, and joists, and also if those timbers are measured neat, according to the drawings and specification, and what allowance is made for sap, slabs, shakes, and other unavoidable waste?—F. N.

[5556.]—**Building Estates.**—Will some experienced reader kindly answer me the following with reference to building estates to be let on leasehold to speculating builders and others:—What is the usual charge, and who pays same (builder or landlord), for—1. Plan of estate as at present plotted from measurements taken, with levels of same; 2. Block plan, showing proposed arrangement of houses, roads, and sewers; 3. Specification, setting out, and superintending construction of, roads and sewers; 4. Letting the plots of ground; 5. The working drawings, specification, and details of houses; 6. Superintending construction of houses? Is it usual to make the same charge to speculating builders as to other clients?—Young Architect.

[5557.]—**Ruskin's Works.**—Can any reader inform me where I can obtain the art and other publications of Mr. Ruskin? My bookseller directs me to write to his address, but I am unable to learn where it is.—B. B. B.

[5558.]—**Variation of Compass.**—Will any of your correspondents kindly inform me what is the variation of the compass from the true north at the present time?—W. A. E.

REPLIES.

[5481.]—**Stamped Agreements.**—"G. H. G.'s" reply a fortnight since is quite beside the question. It amounts only to what he considers the law should be, but does not inform us as to what it is. Here is an extract from a letter addressed to the Somerset House authorities on the very point under discussion—viz., the stamping of building agreements (under hand only), plans, and specifications. The letter is dated December, 1875:—"To be covered by the sixpenny agreement stamps the 'exhibited' plans and specifications must be fastened together and annexed to the agreement, or they may be fastened together and kept separate from the agreement, when they will require another 6d. stamp. If not fastened each separate document must have a sixpenny stamp." I may explain that the word "exhibited" used above means "referred to" in the agreement. These stamps may be the adhesive sixpenny Inland Revenue stamps, commonly known as "agreement stamps." The following is from Cox's "Pocket Notes on the Use of Adhesive Stamps:"—"The stamp must appear on the face of the instrument, and so that it cannot be used for or applied to any other instrument written upon the same piece of material. If more than one instrument be written upon the same piece of material every one of such instruments is to be separately and distinctly stamped with the duty with which it is chargeable. Adhesive stamps must be cancelled by the party to the agreement who first signs the agreement or document, writing on or across the stamp his name or initials, or the name or initials of his firm, *together with the true date of his so writing*, otherwise the instrument is not to be deemed to be duly stamped unless it is otherwise proved that the stamp appearing on the instrument was affixed thereto at the proper time—*i.e.*, before the execution thereof—except in certain special cases, any unstamped or insufficiently stamped instrument may be stamped after execution thereof on payment of the unpaid duty and a penalty of £10. The duty upon an unstamped or insufficiently stamped instrument tendered in evidence, if it be one which may be legally stamped after execution, must be paid to the officer of the court, whose duty it is to read the same, together with the penalty, payable by law, and a further sum of £1. And no instrument liable to stamp duty shall be pleaded or given in evidence, or admitted to be good, useful, or available in law or equity, unless it is duly stamped, save by payment in court as aforesaid." After this explanation I would counsel the original querist not to be led astray by the rash counsel of "G. H. G." to follow the erroneous course which he says he has adopted for so many years. See my reply, and that of "B.," p. 254, present Vol.—L.

[5488.]—**Strength of Woodposts.**—The answers to "M's" question do not seem to have put before him clearly the various classes of columns. To those whose length is 30 diameters or upwards the formula $W = 8\frac{D^4}{L^2}$ alone applies. To columns whose length is between 30 and 5 diameters a correction must be made, as it has been found from experiment that their breaking weight lessens. The true breaking weight of a column whose length is between 5 and 30 diameters $= \frac{WC}{W+\frac{3}{4}C}$. Then W is breaking weight found from formula, C the crushing force of the column. Applying this to "M.'s" example we have 1st—

$$W = 8 \cdot \frac{D^4}{L^2} = 5483 \text{ tons}$$

$$B.\ Wt. = \frac{WC}{W+\frac{3}{4}C} = \frac{5483 \times 2{\cdot}5 \times 144}{5483 + \frac{3}{4} \times 2{\cdot}5 \times 144} = 343 \text{ tons}$$

$$\text{also } B.\ Wt. = \frac{C.S.}{1 + \frac{L^2}{4{\cdot}7^2}}$$

$$= \frac{2{\cdot}5 \times 144}{1 + \frac{5{\cdot}5^2}{4 \times 12^2}} = 342 \text{ tons,}$$

which agrees closely with the other result. I should advise "M." to get Professor Downing's work on "Practical Construction," in which he will find the subject of columns discussed at great length, and all the experiments given, from which the formulæ of Hodgkinson were deduced.—C. S.

[5505.]—**American Timber.**—"J. S." is perfectly right in stating that what is called white pine in America, and yellow pine in England, is the same wood—viz., Pinus Strobus—deriving its name in this country, no doubt, from being of a brownish-yellow colour. But for strength and general use I prefer the yellow or New York pine (Pinus Mitis). Owing to its having a greater proportion of turpentine, it is often found very durable and strong. The pines from the Southern States may be used in dry work; but the lower port timbers of this class are not to be depended upon. Both the white and yellow pine are fit for framing of doors, and will, after being glued up, keep in a perfect plane.—D. D.

[5505.]—**American Timber.**—"Wood's" query shows the confusion into which the nomenclature of timber has got, owing to a want of technical knowledge on the part of timber merchants and professional men generally. Pinus Mitis is the timber called yellow pine in America. It is a two-leaved pine similar to the Pinus Sylvestris, of which it is supposed to be a variety, but grown in a warmer climate. The Pinus Strobus or white pine of America, incorrectly called yellow pine in England, is a five-leaved pine. The former is scarcely, if at all, imported into this country; the latter is much

used here for patterns of castings, doors, and other joiners' work. It is, however, a soft wood; but it holds glue well, and is not so liable to cast as the Pinus Sylvestris, called yellow deal or red wood in the market. If "Wood" will refer to Hurst's "Handbook," p. 325, last edition, he will find the several kinds of timber used in building very clearly described, and he will save much trouble to himself and others. I would also suggest a visit to Kew Gardens, where, by examining the leaves, cones, &c., of the pines and firs, he will soon be able to distinguish one species from another.—J. S.

[5512.]—**Chimney Stalk.**—Is the cause of this chimney cracking not to be found in the iron rings that are built into it expanding from the heat after the second boiler had been set to work—the heat from the one boiler not being sufficient to reach the rings to expand them? Would it not have been better to put the rings on outside the chimney? Their tendency would then be to bind instead of crack.—Peiso.

[5512.]—**Chimney Stalk.**—In reply to "G. H. G." (p. 359), in reference to chimney stalk, the fire-brick lining is 4½in. clear of stalk. In the bottom of stalk there is a number of small chequer holes, which admit a current of fresh air to play between shaft and lining. Then there is an equal number of holes left at top of lining, just under the solid courses referred to by "R." The lining was well flushed. The hoops were set on edge 4½in. from the outside of chimney; they were in two halves, bolted together with strong bolts. The first course of brick in the inside of hoop was end arch brick, set on edge in the best Portland cement. There are three hoops in stalk; the first is set just over the port, and the others 25ft. apart. They are 3in. broad, and ⅜in. thick.—Builder.

[5514.]—**Damp Walls.**—In asking further information, I had in view several cases that have come under my notice in which all the remedies given by your correspondents offhand had been tried in vain, while the cause of the dampness was such as these remedies do not touch. The driving of rain through 10in. walls on the south coast is a very old story. I have heard it of a 2ft. 6in. granite wall, built in cement; but these are things to be believed only when seen, though the water is there plain enough to see. It is an ordinary case to find a costly house built of good hard bricks and good mortar, with the usual 2in. hollow space, and yet the house is so damp, or even wet, in parts as to be hardly habitable. When told that this water is driving through the walls I have generally been able to show that in the commonest houses of the neighbourhood, and the meanest outbuildings, the 9in. walls of ordinary soft bricks never let any water through them. In such cases one searches for other causes of damp—a more easy matter when the house is before the eye than when seen through the medium of your "Intercommunication" column.—Thos. Blashill.

[5520.]—**North Point.**—The reply given by "G. H. G." is not quite correct. The variation of the needle was 22° about 30 years ago, but the needle is constantly approaching the true north. 21° is nearer the truth. To be exact an observation should be taken from the Polar star, finding the time when the star is at the greatest elongation from the "Nautical Ephemeris." All plans when the cardinal points are given, should be made to the true north. If the magnetic north was given correctly to-day, next day it would be incorrect.—W. R. A., Uckfield.

[5520.]—**North Point.**—According to this year's "Whittaker," the variation of needle at London is 18° 50′ west; but as magnetic north varies each year, and is, in the orbit which it makes round true north pole, approaching the time when they shall coincide once more, it is essential that true or astronomical north should show on all maps of any importance. In making use of the needle, care should be taken to know the "variation," both as regards time and place. The needle may even be roughly corrected by an observation of the sun when due south. For this purpose the exact "time before or after clock" may also be found in "Whittaker."—F. J. E.

[5521.]—**Lights.**—The course open to A is to build a screen wall or raise a wooden hoarding before B's windows, so that B should not secure a prescriptive right. Such a protest is at least practicable and polite. Remedies are threefold for an invasion of light—viz., an action for damages, injunction to prevent an invasion, and a mandatory injunction. In all cases a substantial injury must be established, but future damage is taken into account.—G. H.

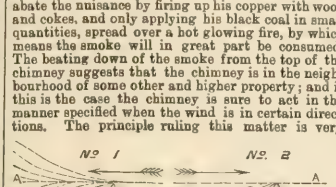
[5521.]—**Lights.**—B should serve A with written notice that he intends to build up to the line of his boundary, and call A's attention to the fact of his inserting windows overlooking B's land, and that he has no right of light beyond the 3ft. provided by A, and that B requires a written memorandum from A to certify that such is an understanding; failing this that B shall at once exercise his right of erecting hoarding along his boundary the probable height and length of his intended erections.—W. S.

[5523.]—**Dry Rot.**—There are very many processes for the prevention and arresting of dry rot, amongst the most successful of which may be mentioned Ryan's process, or the use of a solution of the bichloride of mercury; Payne's process, or the use of the sulphate and muriate of lime, and the sulphate of iron solution; Margary's process, or the use of a solution of the sulphate of copper; Burnett's process, or the use of a solution of the chloride of zinc; and Bethell's process, or the use of creosote, with a small proportion of the pyrolignite of iron. There are some very valuable treatises by Faraday and Birkbeck on the subject. It should always be borne in mind that the circumstances most favourable to the development of the dry rot are damp unventilated situations, and a sub-acid state of the wood. These circumstances should therefore be carefully avoided. J. Adams.

[5523.]—**Arresting Dry Rot.**—This question has been repeatedly answered in the Building News. One of the best means is to saturate the wood with a solution of corrosive sublimate in water, in the proportion of an ounce of the former to a gallon of the latter. A solution of sulphate of copper—½lb. to a gallon of water, laid on hot—is also recommended. One of the simplest remedies is paraffin oil; but the most effective cure is to remove the timber infected, and replace by new, if possible. To prevent the dry rot, well ventilate, and coat with coal-tar.—G. H. G.

[5527.]—**Lawn Tennis.**—I should suggest coal-tar and gravel or ashes, sprinkled over with fine siftings, quarry rubbish, or crushed spar. Portland cement also can be laid by any plasterer or bricklayer, and would answer well.—G.

[5528.]—**Smoke Nuisance.**—"One in a Fix" has got an ugly customer to deal with; but he can abate the nuisance by firing up his copper with wood and cokes, and only applying his black coal in small quantities, spread over a hot glowing fire, by which means the smoke will in great part be consumed. The beating down of the smoke from the top of the chimney suggests that the chimney is in the neighbourhood of some other and higher property; and if this is the case the chimney is sure to act in the manner specified when the wind is in certain directions. The principle ruling this matter is very



simple; but, as it is not generally understood, I inclose a sketch thereof. A, No. 1, shows the line or level of the current of air passing over the house-ridge or any neighbouring property. In this case the chimney will draw badly, and the smoke will damp down. The cure can only be the elevation of the chimney. No. 2 shows the wind in a different direction. In this case the chimney will draw, and the smoke pass away.—W. S.

[5530.]—**Ownership of Fences.**—The almost universal custom is that the fence belongs to that property where the upright poles have been nailed on, and are fair—and not to the adjoining owner, as your correspondent has been informed. That this custom is right is evident from the fact that if, otherwise a person in putting a fence up must trespass on the adjoining owner's property to nail the pales on.—W. R. A., Uckfield.

[5530.]—**Ownership of Fence.**—The fence belongs to the ground upon which the posts stand, and the fair face of boarding is on the neighbour's side.—H.

[5531.]—**London Churches.**—"Provincial" will find an account in last week's Building News of the decoration of one of the largest Classic places of worship—namely, the City Temple. As useful for hints, I may name Marylebone Church, St. John the Evangelist (Waterloo-road), St. Martin's-in-the-Fields, and the Jewish Synagogue. All Hallows, Lombard-street, may be visited as a recently-decorated church.—G. H.

[5533.]—**Party Wall.**—M, by rebuilding his premises, has no right to encroach on the adjoining rooms of N, and therefore the new wall's centre should be shifted 2½in. inwards upon M's ground; but the best plan is to make an arrangement, so that the wall will stand on the same line.—Surveyor.

[5536.]—**Timber for Sills of Sash Frames.**—I should prefer red deal for sills of a sash frame.—Practical.

[5536.]—**Timber for Sills of Sash Frames.**—Red, or, more correctly speaking, yellow deal is more suitable than pitch pine. The turps in the latter will throw off the paint, and leave the wood exposed to alternations of wet and dry. I have used yellow deal upwards of ten years, and prefer it to oak. Plasterer's putty requires to be run about 14 days, to allow the lime to cool. If not used within a month it will rather deteriorate than improve in quality.—Clerk of Works (30 years' experience).

[5537.]—**Architects and Corporations.**—The rules of most corporations require the deposit of duplicates or tracings of plans of all new buildings for approval. A copy of the bye-laws ought to be furnished certainly.—Surveyor.

[5538.]—**Land Drainage.**—"Inexperienced Land Agent" may find the following information of service:—

Soil.	Depth of pipes. ft. in.	Distance of pipes apart. ft.
Stiff clay	2 6 ...	15
Friable clay	2 0 ...	18
Soft clay	2 9 ...	21
Loam with clay	3 2 ...	21
Loam with gravel ...	3 3 ...	27
Light loam	3 6 ...	33
Sandy loam	3 9 ...	40
Light sand with gravel...	4 0 ...	50
Coarse gravelly sand ...	4 6 ...	60

Number of lineal feet of pipes required per acre at distances apart:—

Feet apart.	Lineal feet required.
15 ...	2,900
18 ...	2,421
21 ...	2,073
27 ...	1,614
33 ...	1,314

Taking an average, say light loam, with depth of pipes 3ft. 6in. deep and 33ft. apart.—X. Y. Z.

[5538.]—**Land Drainage.**—If "Inexperienced Land Agent" is able to refer to the printed transactions of the Institution of Surveyors, he will find a paper on "Agricultural Pipe Drainage," which will give him much information as to depths of drains, distances apart, cost per acre, &c. The paper referred to was read by Mr. R. B. Grantham at a meeting of the Institution, Dec. 18, 1871. The transactions of the Institute can be seen in London at the British Museum reading-room, and possibly at the Patent-office Library, Southampton-buildings, and at the South Kensington Museum.—Engineer.

[5539.]—**Law as to Disputed Contract.**—It will certainly depend upon how the contract was framed. If drawn up legally, and stamped, the builder, even if he did not sign the drawings and specification, makes himself liable, the tendering having nothing whatever to do with it if contract or agreement states the terms, as it should do. If the contract has been prepared in a slovenly way, then, of course, the builder can throw over the document and claim his own price. For disputed cases refer to the back volumes of the Building News and to the legal reports.—Business.

[5539.]—**Law as to Disputed Contract.**—The contract is not invalid because the plans and specification were not signed. The signing of these documents is only a ready and convenient method of identifying them. But being unsigned the party tendering them in court has cast upon him the onus of proof that they are the actual documents referred to in the contract. Further, also, it will be the duty of the judge of the court to prevent their being put in evidence if they are not duly stamped, until the stamp duty of 6d., and a penalty of £10 each has been paid, with a further payment of £1 to the officer of the court.—L.

[5541.]—**Flanching.**—A flanching is a protection of tiles round the base of the chimney-pot, to prevent ingress of wet. It answers the same purpose as a lead flushing or the filleting at the edge of a roof against a wall. Cement or ganged stuff is generally used, or a row of tiles in cement is placed along above the roof.—Practical.

[5543.]—**Staining and Varnishing.**—I should say 2s. 6d. to 3s. would be a good price per yard, depending on the labour bestowed. It is not possible to state a price without seeing such work, as there is such a difference in quality and kind of colour.—Surveyor.

[5544.]—**Gauging Flow of Small Streams.**—There are two or three ways of finding the volume of flow. The simplest is to employ a float to ascertain the velocity, or a "current meter," and to multiply by the sectional area of stream. To estimate the velocity properly, it should be remembered that it is greatest in the centre of stream and near the surface, less at the bottom and sides. The mean velocity must be determined. This can be done by multiplying by 0·83, the velocity of the surface, or it is four-fifths of the latter. The best method of estimation is by making a temporary weir by a vertical board thrown across the stream, and puddled well round the edges. A rectangular notch is then made in the centre of stream. If this cannot be done, the next best plan is to obtain the mean velocity as above; take the depth of stream at various points in its breadth, and so find its sectional area. To find the cubic feet of water discharged per second, multiply the mean velocity in feet per second by the area in square feet.—G. H. G.

[5545.]—**Bakers' Ovens.**—Ovens are generally built arched with a ring of fire-bricks set on end, the springing being carried down a little below the floor, which should be of fire-tiles. The arches may be turned on soil, which is filled in the ovens for the purpose. Tie-rods, with end cast-iron plates, are required to prevent the oven's collapsing and binding them together. Cliffe's arch bricks are recomended. I refer "E. A. B." to Vol. XXXI. of the Building News, p. 485, for a drawing of two ovens, about 10ft. 6in. × 8ft. 9in. × 2ft. 2in. high to the arch, furnished by a practical builder—J. A. Berrington. I may add that it is thought best to grout the arch bricks with hot lime instead of using fire-clay. The doors, flue, and other fittings are of cast iron. The furnace is usually placed at the side of the oven's mouth. Flues should be 14in. square, and be over the door. As to the size of ovens, it is usual to allow a floor space of about 7ft. superficial for every bushel of bread.—G. H. G.

LEGAL INTELLIGENCE.

Rescinding a Contract. — At Blackburn County Court, on Friday, the case of Hugh Sled v. Crook and Thompson was heard. Plaintiff, a slater and flagger, sought to recover the sum of £61 3s. 10d., balance of account for work and labour done. Messrs. Crook and Thompson, the defendants, were building a mill, and employed plaintiff to do the slating at 6½d. a yard. The total contract amounted to £56 4s. 10d., and other items brought the claim to £61 3s. 10d. An agreement was prepared by Mr. Birtwhistle, a Blackburn architect, including a schedule relating to the flagging and slating required in the shed, the work to be done to the satisfaction of the architect and the proprietors. Owing to a dispute which arose in reference to the payment for laths and nails, the plaintiff was stopped in his work. Another dispute arose, and the architect declined to sign plaintiff's sheet of works. For the defence it was contended that as this was an entire agreement, to do the whole of the works named in the contract, plaintiff must complete these before he could recover anything. The judge (Mr. Hulton) observed that persons engaged in building ought to strictly examine the conditions under which they worked. He could not say that plaintiff was justified in rescinding the contract, and therefore, as the contract had not been completed, he should order a nonsuit, with leave to bring another action.

Damages for Building Operations. — At Pembroke Dock, on Tuesday week, a case was tried in the county court in which a painter and lodging-house keeper, named John Evans, sued John Morse Henton, also of Tenby, for £50, for alleged damage sustained by reason of Morse's building operations. The plaintiff occupies a house in Crockwell-street, Tenby, adjoining one owned by defendant. In March last defendant enlarged his house, and during the making of excavations at the rear of the premises a wall dividing the properties was undermined and fell, destroying a lean-to shed belonging to plaintiff. It was further alleged that in consequence of precautions not being taken in putting up hoarding, plaintiff's furniture was injured by lime dust, and that owing to the accident in the garden persons declined to take the lodgings. Defendant paid £7, but contended that all necessary precautions were taken to prevent injury to neighbours. The jury awarded £21 as damages.

Extras on a Contract.—At Great Yarmouth quarter sessions, on Monday, a claim for £276 1s. 3d. by Mr. Hines, a builder, at Gorleston, against Mrs. Mary Ann Bass, a smack and house owner, was decided by the Recorder and a petty jury. Plaintiff's case was, that in the summer of 1877 defendant determined to build two houses at Gorleston on her land. Mr. Arnott, architect, was instructed to prepare plans for the proposed houses; these were, however, disapproved by the borough urban sanitary authority. Mrs. Bass persisted in her resolution to have houses erected; other plans were drawn, were passed, and the building was carried out. For the erection of the houses as first planned a contract was entered into between plaintiff and defendant for a sum certain—£400; but as the second plans involved enlargement, defendant was told the houses would cost a good deal more; but, unfortunately, no written agreement was made. £302 4s. 6d. had been received by plaintiff, and the balance of £97 15s. 6d. had since been paid into court as in settlement; but the work had been valued for plaintiff at £578 5s. 9d., and the balance of this was now sought to be recovered. Plaintiff having admitted in cross-examination that he had since the writ was issued informed the architect that he agreed to build for £400, the Recorder said the case resolved itself into one of extra work. The jury, having heard evidence in detail on both sides, found a verdict for plaintiff for £58 12s., with costs.

A new Congregational church and schools are to be erected at Oiton, from designs by Mr. John Hall Gibbons, architect, of 44, Ann-street, Birmingham. The building will be of red brick with stone dressings, and the roof covered with brindled tiles. The style is Early Gothic, and the church will seat about 275 adults.

The Bedford rural sanitary authority have decided to carry out a scheme of sewerage on the irrigation system for Kempston, in accordance with plans to be prepared by Mr. Adams, C.E.

Camberwell Grove Baptist Chapel, S.E., was re-opened on Sunday, after undergoing extensive internal alterations. The old-fashioned pews have been replaced by others of a lighter character, the massive pulpit has been replaced by a simple reading desk, with platform in front, and the gallery has been refronted, and more roomy approaches provided. The improvements have been carried out by Mr. Falcon, of New Kent-road, at a cost of £1,270.

A porch is being added to Heath-cum-Beach parish church, Bedfordshire, from the designs of Mr. Laurence, of Leighton Buzzard. Mr. Edwards, of Egginton, is the contractor

A new church is about to be built at Peel, Isle of Man, from the designs of Mr. Charles Barry, of Liverpool.

Our Office Table.

According to the mineral statistics for 1877, clays, porcelain, and potters' and fire-clays show a considerable falling off from 3,971,123 tons, valued at £744,224 in 1876, to 2,961,155 tons, valued at £592,231. There was a decrease in Cornwall of the fire-clay produced, and a large increase in the fire-clays obtained from the coal measures from 2,140,013 tons in 1876 to 2,568,357 tons. The fire-clays are largely exported to foreign countries for the manufacture of porcelain and pottery, more especially to France, Holland, Belgium, Spain, Norway, and Italy. Of potters' clays, extensively wrought near Poole, in Dorsetshire, the quantity shipped from the port of Poole in 1877 to British and foreign ports amounted to 56,241 tons, that used at works within the district amounting to 16,570 tons.

There are now in the Audit House at Southampton plans, which have been prepared by Mr. J. Lemon, for the proposed new Public Offices. These are arranged on one side of the room, and on the opposite side are the plans which he has prepared for altering the Audit-house buildings, and converting them into public offices. The latter plans, lettered A, B, and C, have been approved by the Public Offices Committee, and, if adopted, the Council Chamber will remain as at present, but the buildings between that and the adjoining premises will be pulled down, as well as the back premises, as far as the Green Market, and rebuilt, when office accommodation will be provided for the various Corporation officials, as well as a committee-room, the Mayor's parlour, and Mayor's reception room. The front of the new portion of the building will be uniform in style with the Audit-house, and where the entrances to the market now are will be placed large windows. The total cost of these alterations is estimated at about £6,000. By the adoption of the other plans the whole of the present building will be demolished, and an entirely new structure erected, the front of which will be of a much more showy character in something of the Italian style. The probable cost of the new building will be about £20,000.

It is stated by the *Engineer* that Mr. Frederick Ransome, who has long been labouring to produce the much-needed material, has at last succeeded in making a cement chemically identical with Portland cement, although composed of different raw materials. What these materials are, or the nature of the process by which they are combined, we know nothing about, as Mr. Ransome's experiments have not yet been concluded, or his patents finally settled. This cement is to be used precisely like Portland cement, and is stated to possess exactly the same qualities. When dry it is a cream colour, very nearly pure white. It contains no salt to effloresce, and can be manipulated just like Portland cement. Mr. Ransome has submitted two specimens of this cement to our contemporary in the shape of tablets about 3in. square and ¼in. thick. One is almost white, and was made on the 8th of August. The other, about as old, is rather darker in colour, and resembles Caen stone. Nothing can yet be said concerning the tensile strength or mechanical qualities of the material. The specimens have been far too recently made to warrant any opinion as to the hardness which they may ultimately assume. The *Engineer* sees no reason to doubt that the material may possess all the excellent qualities attributed to it by Mr. Ransome, who ought to know as well as most men what is and what is not a good cement, and it is certain that a material of the given colour, which is as good as, and can be worked like Portland cement, will constitute a great improvement on anything in architectural cements now in the market.

A writer on the New Forest in the *Gardeners' Chronicle* adds a few words on the forest as a great wood-farm. This is at present the reason of its existence, and though these 60,000 acres could never be much good for anything else, yet it is admitted that there is a constant outcry against this (so-called) waste of good land. The best answer to this is to make the forest justify its existence by making it produce good timber in the greatest possible quantity. The impression left on the writer during his walk through the forest was that it was not farmed as a wood-farm by any means to the best or fullest extent. Not to speak of the great extent of heath that still remains unplanted, he is sure that the trees in the open forest, and especially in the plantations, are much too thick for vigorous or healthy growth. He thinks that at least one-half of the trees in the open forest spaces might be cut with great advantage to the survivors, and with no diminution, and probably an increase, of beauty. And in the plantations the crowd is so great that two-thirds might go. It is a canon with most good foresters that when one tree touches another it is time for the axe, and the New Forest is no exception, for wherever the trees are thinner than usual, and still more where they are isolated, there are to be found the best specimens.

The tallest accurately measured Sequoia—or Wellingtonia, as it is generally called in England — now standing is in the Calaveras Grove, near Stockton, California, and measures just 327ft. in height, or an equal height to that of the Clock Tower at Westminster. There are other fallen trees in this and other groves which must have been of still greater altitude before decay and forest fires compassed their destruction; but as far as can be judged no Sequoia has grown to a greater height than 400ft. Of late years, however, explorations in Gippsland, Victoria, have brought to light some marvellous specimens of Eucalyptus, and the State Surveyor of Forests measured a fallen tree on the banks of the Watts river to be 435ft. from the roots to the top of the trunk. The crest of this tree was broken off, but the trunk at the fracture was 9ft. in circumference, and the height of the tree when growing was estimated at more than 500ft. This tree, however, was dead, though there is no doubt that it was far loftier than the loftiest Sequoia. Near Fernshaw, in the Dandenong district, Victoria, there has recently been discovered a specimen of the Eucalyptus amygdalesia, or almond-leaf gum, measuring 380ft. from the ground to the first branch, and 450ft. to the topmost wing. This tree, if planted at Westminster, would overtop the clock tower and the tallest living Sequoia by 120ft. Its girth is 80ft., which is less than that of many Sequoias, but it must be considered the tallest living tree in the world.

Having examined the designs of the late Mr. Stephens for decorating the dome of St. Paul's, which are now proposed to be carried out in mosaic, Mr. J. P. Seddon feels called upon to express his conviction that the existing treatment by Thornhill is much the better of the two. The vast expenditure contemplated in order to substitute the former for the latter would, therefore, in Mr. Seddon's opinion, be worse than wasted, and might be better applied in decorating other spaces at present bare and really needing colour, such as the transept domes and the semi-domes around the cross. The successive ranges of circular panels in Mr. Stephens's design would become a series of distorted ovals upon the curved surface of the dome, and appear monotonous in the extreme; and the outline of the vertical bands of ornament between them is ungainly; while the dark tone of the pictures in the panels, rendered in mosaic, would tend to bring down the dome in effect. On the other hand, the general arrangement of Thornhill's paintings and of their decorative architectural framework is satisfactory, leading the eye upwards, and as to details, the pictures are too high for minute criticism. Mr. Seddon pleads that what is well may be left alone, and that the able painters chosen for the work may be allowed to exercise their talents elsewhere within the building, in places where their work would be better seen, and where it would not obliterate anything that hereafter might come to be regretted when too late.

We have been requested to give publicity to the following letter, written by the secretary of the Institution of Civil Engineers to the secretary to the trustees of the Clyde Navigation, Glasgow: "The council of the Institution

of Civil Engineers have been informed that a statement has been made to the Clyde Trustees that civil engineers are in the habit of receiving double commissions—that is to say, from their employers and from the contractors engaged to do the work. I am requested by the council to give the most unqualified contradiction to this statement; and to add that, in the opinion of the council, such a practice would be distinctly dishonest, and would constitute a disqualification for membership of this institution."

The "Madonna dei Candelabri," of Raffaelle, has generally ranked as one of the greatest compositions of that master. Mr. J. C. Robinson, F.S.A., has just published in pamphlet form some remarks upon this picture, in which he asserts that it was the first executed of a series, including the "Madonna della Seggiola," at Florence, the "Pesce," at Madrid, and the "San Sisto Madonna," at Dresden. These last works have long been celebrated, but the "Madonna dei Candelabri" appears to have been involved in some obscurity till a very recent period, and connoisseurs have even doubted the authorship of some portions of it. There happen to be two competing pictures of this subject. One is known as the "Novar" Raffaelle. Mr. Robinson, it appears, has in his possession another picture of the same subject, purchased by him in 1875, and which he believes to be of the age, exact style, and technique of Raffaelle. It differs in important particulars, he says, from the "Novar" picture, which was offered for sale lately at Messrs. Christie's. Comparing the latter with it, Mr. Robinson thinks that both pictures could not have been painted by the same hands; that the one in his possession exhibits no evidence of having been copied from the "Novar" rival, and that his investigation warrants the supposition that no other picture of Raffaelle of superior excellence exists, which might have been the prototype of both these in question. We have no space here to enter into the minute analysis of both pictures made by the writer as regards the variations in design, the chiaroscuro, colouring, expression of the Virgin's head, and other details, but join him in hoping, for the sake of artists and connoisseurs of Raffaelle, that both these reputed pictures may be exhibited side by side so that a just conclusion may be arrived at in the interests of art. Mr. Robinson's elaborately-written analysis will, however, be read with interest by all lovers of art.

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WATER SUPPLY AND SANITARY MATTERS.

Glasgow.—A report has been received by the town council of Glasgow from Messrs. Bateman, C.E., and Hill, C.E., on the disposal of sewage. Three alternative schemes are suggested, each based on an estimated future population of 1,350,000 persons. By the first, the sewage would be raised by pumping from the south to the north side of the city, the whole to be taken to Dalmuir at a cost of £858,000. The second proposes that the sewage on the north side should be taken to the south, and the whole conveyed to Shiels, in the parish of Govan, at an estimated expenditure of £716,000. The third scheme suggests that the sewage on the north side should be taken to Dalmuir, while that on the south side should be taken to Shiels, the cost in this case being £867,000. These sums do not include the price of land and interference with property, nor do they estimate the cost of dealing with the sewage at the outfall, which the engineers sets down at from £40,000 to £45,000 per annum.

Kingston-on-Thames.—The Thames Valley Sewage Board met on Wednesday to consider schemes sent in for the drainage of the united district, and after five hours' discussion it was resolved that the schemes of Messrs. Bailey Denton, Son, and North, W. Haywood, F. Wentworth, Shields, and James Mansergh, be referred to a select committee, with power to obtain such professional assistance as they might need, and report to the board as early as possible.

Windsor Drainage.—The new sewage works, situate upon the Ham, at Old Windsor, were opened on Monday. The new drainage system consists of a 4ft. 6in. brick sewer, extending from Windsor for about two and three-quarter miles to Old Windsor, and thence under the navigation cut to the Ham, which lies south of the old course of the Thames. The sewage, upon reaching its destination, is subjected to Hillé's purifying process. The entire cost of the new system will exceed £30,000. The engineer is Mr. Hawkesley.

CHIPS.

Several gentlemen recently visited Messrs. Walker's yard, Deptford, to inspect the frame of the Duo in Uno, a steam lifeboat which is being built on the principles laid down by Mr. Edward Thompson in a paper read by him at the last meeting of the Institute of Naval Architects. The principles on which this boat is built are as follows:—That a vessel built with a cellular frame, and tunnelled after body with a single bow, will be practically unsinkable; that the propeller, when placed between the bodies, will be free from "racing," out of reach of injury from wreckage, and that to a great extent the loss of power from the slip of the screw will be obviated; that the position of the screw working near the centre of the vessel, in solid water, will enable her to be reversed within her own length, at the same time retaining her steering powers unimpaired; that the issuant water from the tunnel being left in a straight course behind will not hurt the banks of a river or canal, and will thus be invaluable for inland navigation; that the vessel will be able to carry a much greater spread of canvas, while the screw (placed as proposed), when disconnected, will be no impediment to sailing; and that boats of this description would be extremely useful in a heavy surf, and as Channel or ferry steamers. The experimental boat is 32ft. in length by 8ft. in breadth, having a mean draft of 2ft. 6in., and will be ready about the end of the present month, when a trial trip will probably be made with her.

The Princess Alice disaster has elicited a suggestion that river steamers should be so built that the deck should be complete in itself, and capable of floating like a raft, even with a considerable weight of passengers, and that it should be secured to the hull by a fastening of a temporary character, which could readily be withdrawn in time of danger, leaving the hull free to sink alone, while the deck would be left upon the surface. Explaining how he would accomplish the ends, he says a simple way of fastening the deck to the hull would be by eyes descending from the under surface of the deck, and passing through slots in angle irons, which should form part of the sides and of the upper surface of the hull. Each of these eyes should receive a 1½in. pin, and all the pins should be connected to a chain, or to levers worked by a chain, which should itself be carried to a wheel placed immediately astern of the steering wheel. It would then be easy for the steersman, on an alarm being given, to withdraw the whole of the pins by a single movement.

The *Polytechnic Review* in a recent number says:—"The London *Engineer* is responsible for the extraordinary statement that 'Mr. F. W. Schroeder, formerly a lieutenant in the United States army, proposes to construct an aërial ship. The buoyancy of the machine is to be obtained with carbonic-acid gas.' The New York *Times*, it adds, 'seems to think the invention will be successful,' from which we infer that the *Engineer* obtained its information from the *Times*. The introduction of carbonic-acid gas as a levitating agent for balloons will doubtless be an event in the history of aërostation. We await developments with interest." The mistake is obvious. Mr. Schroeder kept his air-ship or balloon filled with carbonic acid for some weeks in order to test the impermeability of the fabric!

The experiments carried on by M. Mouchot during the Exhibition with regard to the industrial utilisation of solar heat are instructive. They had for objects, on the one hand, the cooking of food, and the distillation of alcohols; on the other, the use of solar heat as a motive force. In the matter of cooking it was found that mirrors of less than one-fifth square metre sufficed to roast half a kilogramme of beef in 22 minutes, to complete stews in an hour and a half that required four hours with an ordinary wood fire, and to raise to boiling, in half an hour, three-quarters of a litre of cold water. A pure brandy was obtained in a short time from the distilling apparatus. For obtaining motive power M. Mouchot had constructed a large solar receiver, the mirror having an aperture of about 20 square metres. In its focus was placed an iron boiler weighing with accessories 200 kilogrammes, and having a capacity of 100 litres, 70 being devoted to water. This apparatus was put in action on the 2nd of September for the first time; in half an hour the water was raised to boiling, and a pressure of 6 atm. was ultimately registered. On the 29th, a pressure of 7 atm. was reached in two hours, notwithstanding several passing vapours. On different occasions the steam (with a pressure of 3 atm.) was made to drive a Tangye pump, raising 1,500 to 1,800 litres of water per hour a height of 2 metres, and to produce ice in a Carré apparatus.

Speaking of the display of British ceramics at the Paris Exposition, *Les Mondes* calls attention to "the brilliant specialties of the factory at Worcester, the English Sèvres." The imitations of ivory are said to be so perfect as to deceive the eye, and require the testimony of the touch in order to detect the deception. Among the statuettes are some Chinese figures, which one would judge to be chiselled in ivory by the most skilful sculptor of China.

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RIDGE TILES, FINIALS, BRICKS, TILES, &c., which are hard in texture, smooth, and of a deep red colour, and will resist the action of the weather.

Architects' Designs faithfully carried out. Samples of Work South Kensington Museum. Estimates on application.

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Patent New System of
AIR AND WATER-TIGHT
GLAZING WITHOUT PUTTY.

NO WOODWORK IS EXPOSED
AND
NO OUTSIDE PAINT REQUIRED.

See Opinions of the
BUILDING NEWS, *Builder, Field, Gardener's Chronicle.*
AND OTHER LEADING PAPERS.

T. W. HELLIWELL, Patentee,
Brighouse, Yorkshire.
BRANCH OFFICE: 19, PARLIAMENT-STREET, LONDON, S.W.

Trade News.

WAGES MOVEMENT.

EDINBURGH.—At a meeting of master joiners, held last week, it was unanimously agreed that, owing to the present stagnant state of the trade, intimation should be given to the operatives that on and after to-day a reduction of ½d. per hour will be made on the present rate of wages, making the rate in future 7½d. per hour for competent workmen.—The notice of reduction of wages in the building trade has assumed a more general scope than would seem to have been anticipated. Under the reduction intimated the rate of joiners' wages will be 7d. per hour, and that of labourers 4½d. per hour. It would seem that the master joiners are not altogether at one as to the extent of the reduction.

FLEETWOOD.—The master joiners of Fleetwood have given their men notice of a reduction of 1d. per hour.

WHITLAND ABBEY GREEN SLATES.
These SLATES are of a grey-green tint, are stout, and made in all sizes. A large stock available for immediate delivery. For further particulars (with a list of important buildings covered) apply to the MANAGER, Clynderwen, R.S.O., Carmarthenshire.—[ADVT.]

Holloway's Ointment is not only fitted for healing sores, wounds, and relieving external ailments, but rubbed upon the abdomen it acts as a derivative, and thus displays the utmost salutary influence over stomachic disorders, derangements of the liver, irregularities of the bowels, and other intestinal inconveniences which mar man's comfort.

Lamplough's Pyretic Saline is refreshing, most agreeable, and the preventive of FEVERS, BILIOUSNESS, SMALL-POX, SKIN DISEASES, and many other spring and summer ailments. Sold by chemists throughout the world, and the Maker 113, Holborn Hill. *Use no substitute.*—[ADVT.]

TENDERS.

ABERDARE.—For the erection of a dining-hall and day-room at Aberdare training school, for the Merthyr Tydfil Board of Guardians:—
Morgan, John (accepted) £526
[Only one other tender, £576, received.]

ABERYSTWITH.—For the erection of a new Welsh Wesleyan chapel. Mr. Walter W. Thomas, architect, Liverpool:—
Rees, John £2,759
Jones, John 2,600
Jones, Thomas (accepted) 2,550
Evans, Jno. and Daniel 2,390

ALCESTER.—For sewerage works, Alcester. Mr. E. Pritchard, C.E., engineer, 27, Great George-street, Westminster, S.W., and Warwick; quantities by Mr. E. J. Purnell, Coventry:—

	No. 1.	No. 2.
Smallwood, J., and Co., Wotton Hawen ...	£3,850 0 0	£3,000 0 0
Hill, Wm. & Hy., Bristol...	3,837 15 0	2,976 19 0
Mackay, Jno., Dowlais ...	3,311 0 0	2,517 0 0
Barber, Miles, Barlbro ...	3,300 0 0	2,514 0 0
Taylor, W. R., Bilston ...	3,126 0 0	2,450 0 0
White, Jno., Handsworth...	3,119 19 0	2,486 6 0
Pickthall, J., and Sons, Stockport	2,907 15 9	2,334 9 6
Heap, Walker, Birmingham	2,866 0 0	2,185 0 0
Gannell, W. L., Bristol ...	2,843 0 0	2,300 0 0
Dewitt, Jas., Leamington...	2,816 0 0	2,145 0 0
Hilton & Co., Kidderminster	2,800 0 0	2,170 0 0
Meats Bros., Nottingham and Birmingham... ...	2,800 0 0	2,170 0 0
Palmer, A., Birmingham ...	2,797 0 0	2,238 0 0
Horsman, P. and Co., Wolverhampton	2,725 0 0	2,110 0 0
Bush, Jas., Ulverston ...	2,658 0 0	2,070 0 0
Currall and Lewis, Rowley	2,606 0 0	2,075 0 0
Green, W., & Sons, Warwick	2,473 0 0	2,015 0 0
Law, Geo., Kidderminster	*2,044 0 0	1,997 0 0

* Error (corrected), £2,444.

BATH.—For the reparation of houses in George-street, Bath:—
Bladwell, J. £798
Birth 797

BOWDEN, CHESHIRE.—For the erection of a new Baptist chapel and schools. Mr. Wm. Owen, architect, 134, Deansgate, Manchester:—
Pennington, J. (accepted) £2,075

CANTERBURY.—For St. Andrew and St. Mary Bredman's Rectory, Canterbury. Mr. John Green Hall, architect:—
Denne, G. H. £2,360
Wilson, H. B. 2,328
Gaskin, J. C. 2,300
Cosens, J. F. 2,169
Adcock, W. S. 2,150

CARMARTHEN.—For laying 250 yards of water-main, in Priory-street and the Parade, for the Town Council. Mr. Hutchings, borough surveyor:—
Rogers, Geo... ... ... £65 10 6
Rogers, D. 56 0 0
Bright and Garrard 43 15 0
Evans, D. (accepted) 42 10 6
[Surveyor's estimate, £42 8s.]

DUNDALK, IRELAND.—For portion of mission and retreat-house for the Rev. Henry Harbison. Mr. George C. Ashlin, architect:—
Hammond and Son £12,144
Cunningham 12,131
Clarke 11,516
O'Hare 9,895
Redmond 9,729
McAdory (accepted) 9,700
Cullen 9,422

WINCHESTER.—Modern schools, Winchester:—
Stiff, Dover £8,899
Crook, Southampton 8,749
Hoare Bros. and Walden 8,200
Stephens and Bastow 7,999
Stevens and Son, Southampton 7,760
Jones and Co., Gloucester 7,656
Fielder and Son, Winchester 7,650
Marsh, Winchester 7,330
Carter and Son, Winchester (accepted) ... 6,995

WOKING.—For three cottages, Sutton, near Woking. Messrs. Smallpiece and Bishop, surveyors:—
Butt (accepted) £435

HOMERTON.—For alterations to the small-pox hospital at Homerton for the managers of the Metropolitan Asylum District, Messrs. A. and C. Harston, architects, 15, Leadenhall-street, E.C.:—
Wheeler and Co. £1,695
Norris 1,577
Cooke and Co. 1,393
Wood 1,300
Upson 1,290
Wise 1,280
Ivory (accepted) 1,175

KILBURN.—For the erection of four detached villas in Woodchurch-road, Kilburn, N.W. Mr. Banister Fletcher F.R.A.S., architect:—
Bayes £7,000
Prout, W... 5,680
Castle 5,484
Butcher, W. H.... 5,450
Hobern 5,381
Whiteman 5,140

LONDON.—For alterations and additions to warehouse No. 24, George-street, Tower-hill. Messrs. Smallpiece and Bishop, surveyors:—
Perkins, R... ... ... £471
Lidstone and Son... 429
Gardner (accepted) 386

LUTON.—For sanitary works in Park-town for the Town Council. Mr. W. H. Leete, borough surveyor:—
Coker, J., of Thirkby £1,750 1 0
[Surveyor's estimate, £1,145 14s.]

for Messrs. Ellison and Kerr. Mr. Walter W. Thomas, architect, Liverpool:—
Leslie, James £985 0 0
Makinson and Glover 980 0 0
Nicholson and Ayre 959 0 0
Wilkinson, George 850 10 0

RIPLEY.—For new farm buildings, Sussex Farm, Ripley. Messrs. Smallpiece and Bishop, surveyors:—
Christmas £531 0 0
Harms 365 15 0
Butt 354 0 0
Whitburn (accepted) 320 10 0

SHOREDITCH.—For the construction of sewers, the formation of carriage and footways, alteration of roads, and other works in connection therewith, in the new thoroughfare between Sun-street and Worship-street, for the Metropolitan Board of Works. Sir Joseph W. Bazalgette, engineer to the Board:—
Cooke £13,030
Webster, W. 12,300
Hook and Oldrey 11,643
Aspinal and Son 11,000
Crockett, W. 11,000
Stevens and Co. 10,000
Mowlem and Co. 9,985
Nowell and Co. (accepted) 9,785

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BATH STONE OFFICE, CORSHAM, WILTS. [ADVT.]

EPPS'S COCOA.—*All the Year Round* says—"Let us stroll to the Euston-road, hard by the Regent's Park, to Epps's Cocoa Manufactory, where may be studied the making of cocoa on a stupendous scale, giving a just idea of the value of these articles, not as luxuries, but as actual food."

EPPS'S COCOA.—*John Bull* says—"An idea of the vast extent of the industry may be gained from the fact that one firm alone—that of Messrs. Epps & Co.—now sell some 4,000,000 pounds annually."

EPPS'S COCOA.—*Christian World* says:—"If I am to take cocoa," said I, "I must see and judge for myself what are the ingredients of which it is composed; with this view I made my way to the cocoa manufactory of James Epps & Co., in the Euston-road."

EPPS'S COCOA.—"Cassell's Household Guide" says—"We will now give an account of the process adopted by Messrs. James Epps & Co., homœopathic chemists and manufacturers of dietetic articles at their works in the Euston-road, London."

EPPS'S COCOA.—*Morning Advertiser* says—"Nearly two centuries after, in 1832, the duties, which had hitherto been almost prohibitive, were greatly reduced, and one of the first to take advantage of re-establishing the popularity of cocoa was Messrs. Epps & Co., the homœopathic chemists."

ROOFING FELTS.—F. BRABY & CO.
INODOROUS, SARKING, SHEATHING, AND HAIR FELTS KEPT ALWAYS IN STOCK. MANUFACTURERS OF
PERFORATED ZINC, PERFORATED COPPER, & PERFORATED IRON
IN VARIOUS DESIGNS AND GAUGES.
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GALVANISED AND BLACK IN ALL GAUGES, KEPT IN STOCK. ZINC WORK OF ALL KINDS.
FITZROY WORKS, EUSTON ROAD, LONDON, N.W.; Hatton Garden, Liverpool; Great Clyde-st., Glasgow; and at CYPRUS.

THE BUILDING NEWS.

LONDON, FRIDAY, OCTOBER 25, 1878.

ST. JAMES'S CHURCH, PICCADILLY.

BETWEEN Piccadilly and Jermyn-street, on the north side of St. James's-square, separated from the former thoroughfare by a wall, stands one of the least sightly—externally, at any rate—of Wren's churches. We refer to St. James's. This church has lately been closed, and was opened last Sunday, after having undergone some alterations and renovations. Before we speak of the manner in which these have been carried out it may not be out of place to say something of the edifice itself. Vastly altered, indeed, has the locality become since Wren's time. Less than three centuries ago the whole tract between this church and Charing-cross was open field or garden ground. Pall-mall is described by Pepys, in his "Diary," as "sweet and shady," fringed with elm trees "in a very decent and regular manner;" mansions with gardens stood on the south side, while the north—the site on which now stands St. James's Church—was quite open. Even St. James's-street only dates from the middle of the 17th century, and many of the old buildings have disappeared.

The Church of St. James appears to have been consecrated in 1684, and it is well to remember that its illustrious architect resided close by, in St. James's-street, where he died in 1723. As a Court suburb this locality at the time of the building of the church must have enjoyed considerable privileges, and not a few nuisances; and we have only to consult the pages of Addison, Macaulay, Thackeray, and John Timbs, to picture to ourselves the style of residences and the manners and customs of those who frequented St. James's Church and the neighbourhood. A view of St. James's-square a century ago shows the church from the square, and the open fields beyond; but Macaulay, describing it as it appeared in 1685—the year after the consecration of the church—says of the square that it "was a receptacle for all the offal and cinders and for all the dead cats and dogs of Westminster," and that at another time "an impudent squatter settled himself there, and built a shed for rubbish under the windows of the gilded *salons* in which Norfolk, Ormond, Kent, and Pembroke gave banquets and balls." In the old print of the square we have referred to, an octagonal enclosure, filled with water, existed. We might fill a page with the names of its illustrious residents, but pass on to notice the church itself.

It was built at the cost of £8,500 (Henry Jermyn, Earl of St. Alban's, being the chief subscriber), as a chapel-of-ease to St. Martin's-in-the-Fields, and was finished in 1684, at a very critical period, and within a short time of the close of Charles II.'s reign. Its chief interest to us, however, is in connection with the fact that Sir Christopher Wren designed it, and is said to have taxed his powers to provide "a room so capacious, with pews and galleries, as to hold 2,000 persons, and all to hear the service and see the preacher," and we have it on record that Wren considered this to be one of his best churches. That great master of planning endeavoured to adapt both the Greek cross and the basilican type to congregational purposes, and St. James's is certainly one of the best studied arrangements on the latter plan. Its proportion has been fixed from a careful consideration of the range of the human voice, and the galleries are skilfully contrived to enable every one in them to see and hear the officiating clergyman. To estimate properly the interior of this church we must look back at the condition of religious worship of the time. We must remember it was in the period of the Revolution; the Church and the Nonconformists were struggling for ascendancy, though the false pledges of Charles and James II. had tended to make England more Protestant than ever. We cannot wonder that this national sentiment found utterance in the prevailing style of church building—that the ecclesiastical tyranny of James should have brought about a reaction, and have favoured the views of Leighton and Tillotson. The wants of congregations rather than the requirements of priests led to the erection of cumbersome galleries and pulpits, and the unpronounced sacrarium, and Wren had the skill to adapt these wants in the least offensive manner. In St. James's he seems to have been successful in perfecting his plan. Here we have a church in which the galleries are the least obtrusive of any we know of, forming as they do an entablature between two orders, or the piers supporting the gallery and the Corinthian order above, which carries the main circular vault and the cross vaults above the galleries. Thus a great economy of space and roofing is effected, and the wide unsightly ceiling we see in most galleried interiors is avoided. The gallery in fact, becomes no longer an obtrusive feature, supported on a row of independent pillars projecting into the body of a wide church, but in reality an integral part of the building. The circular ceiling of plaster springs from an entablature of the Corinthian order, the columns of which divide the nave and aisles into five bays. Each compartment of the centre ceiling is divided by ribs, with a kind of enriched guilloche, and is panelled in three. Perhaps the weakest part of the design is at the intersection of the middle vault with the side arched bays, and the want of apparent support to the wall end of the cross beams or entablatures from which the side arches spring, there being at the wall end only an enriched corbel. Directly above the intersection of the side arched vaults and main ceiling are small elongated panels, the under side following the curve of the cross vault; and these panels are decorated with plaster enrichments of foliage, with cherub heads in the centre. The upper panels of the main ceiling are quite plain, with the exception of pateræ perforated for ventilation at the crown. One of the chief features of the interior is unquestioubly the treatment of the east end. There is no recess, except a very slight reveal at the sides of the large eastern window, which extends from the top of the reredos to the ceiling. The window is of three lights, divided by pilasters of the Corinthian order, and is of two orders also in height, the upper centre light having a circular head. The effect is not unpleasing, and the double tier is adorned with stained glass, representing "The Agony in the Garden," "Our Lord Bearing the Cross," "The Passion," and "The Ascension"—the two last subjects occupying the lower and upper central lights respectively. The glass was inserted in 1846. The altar-piece, however, is certainly the *chef d'œuvre* of the interior, and is a most interesting example of the decoration of the period, though we cannot say we are pleased with the large gold surfaces of the Decalogue panels, which appear to kill the *ensemble*. The upper part of the altar-piece is pedimented segment shape, and the sides are adorned by pilasters, which form a continuation of those of the gallery. In the space thus formed between the two panels for the Commandments and the outer framework is a flat surface, now painted a dark olive green, enriched by some striking carvings of Grinling Gibbons. These form garlands and flowers, the centre subject beneath the pediment being a beautifully-carved pelican with her young. On each side is a dove, while the side spaces are filled with garlands and bunches of fruit and flowers, most richly designed, and in alto-relievo. Evelyn describes the altar-piece in his "Diary" as surpassing any in England or abroad, and mentions the white marble inclosure, the rich plate given by Sir R. Greere, &c. The pulpit and reading-desk are also interesting as examples of woodwork of the 17th century. The pulpit of oak is hexagonal, and stands upon a cluster of three fluted Corinthian columns, also of oak; the base of the pulpit, of ogee contour, is richly carved with a leaf pattern, while the angles are supported by detached pillars, spirally carved, with Ionic volutes, the side panels being adorned with carvings representing Scriptural scenes. Round the top is a rich hollow-leaf cornice and frieze, with cherubs' heads introduced over the panels. The angle pillars are terminated by carved pendents, and the stair railing is a beautifully executed piece of scroll-work. The reading-desk has been reduced in height by cutting down the base. A plain open-railed top square on plan forms the desk, which is supported on a solid panelled base. The white marble font is a remarkably good example of the design of the period and the skill of Grinling Gibbons, its carver, representing the Fall of Man, the Salvation of Noah, and other subjects. A small circular shallow bowl is supported by a rather lofty stem, in the form of the trunk of a tree; at the roots or base stand, one on either side, figures of Adam and Eve. the serpent coiled round the upper part of the trunk, and presenting Eve the apple. They are cleverly sculptured. The bowl is adorned at its base by the foliage and fruit of the tree, and on one side we observe a bas-relief carving of the baptism of St. John. A fine organ adorns the west end, and is said to have been built for James II.'s oratory at Whitehall, but was given to the church by Queen Mary II. in 1691. We cannot say much for the church externally; it is too plain to need description. The dingy brick walls are relieved by stone window-dressings of almost ugly proportions, and the tower at the west end, with its wooden spire, is the only feature of any interest. This steeple, says Timbs, was the work of a carpenter, whose design was preferred to that of Wren from motives of economy, but we should be sorry to vouch for the truth of the statement. It is said a fire occurred in 1792 in the vaults, and a large number of coffins were destroyed. Several eminent divines have been rectors of St. James's. Hoadley, afterwards Bishop of Winchester, Drs. Tenison and Secker, Archbishops of Canterbury, were rectors of the church; Dr. Samuel Clarke also, the well-known philosopher and theologian, the author of doctrines of a semi-Arian character, and chaplain to Queen Anne, was rector of the parish in 1709. Many celebrated men repose in the churchyard, among them Brookes, the anatomist.

One of the alterations made during the last few weeks consists in the rearrangement of the east end of the church. The high-panelled pews of oak have been reduced in height round the reading-desk and pulpit; these have been shifted from their former positions and placed farther westward, so as to give room for the additional step to the altar enclosure, which previously was nearly on a level with the church floor. The upper step is of black marble from the Isle of Man. The railing is of white marble, with bronze open panels of scroll-work; a new capping has been added, and an extension to the width of the sacrarium of about 8ft. has been made. The background of the reredos has been painted a dark green, diapered, and with the black and white marble paving of the sacrarium arranged

geometrically, a considerable improvement has been effected in this part of the church. The single Corinthian columns supporting the roof are of Sienna marble imitation, but the capitals have been wholly gilded. The lower pillars are painted chocolate, but no attempt to relieve the capital mouldings or egg and tongue ornament in them is made. We find the walls have been simply coloured a buff tint, and the panelled ceiling plainly distempered a cream white. It is rather a pity a more complete scheme of decoration or relief was not attempted, as the interior has still a very unfinished look, and the ornamental ceiling certainly looks out of keeping with the decorative treatment of the columns and their gilded capitals. There was an excellent opportunity for the introduction of a little tinting to the plaster enrichments and panels, if not of gilding moderately expended, and we see the enhanced effect of the latter treatment in the few panels at the extreme east end of the ceiling over the altar which have been picked out with gold. Wren himself, we believe, intended these plaster ceilings to be relieved in some way, though the parish authorities in this instance appear to have acted upon the safe principle of doing as little as possible. The only objects that strike the visitor are the columns, the darkly-painted east window, the rich organ over the west gallery, and the stained glass in the windows; but we conceive these features would have been united and harmonised by a more general scheme of moderate decoration. One feature certainly calls for some relief, and that is the gallery front. This forms an entablature to the lower pillars, and we consider a little judicious colour in some of the mouldings of the cornice would much enhance the effect, without obtruding it upon the eye. We fully commend the removal of the font from under the west gallery to the octagon vestibule, the marble paving, and the stained glass window in place of the centre tower door, thus opening up a lost feature, and bringing into notice a striking work of 17th century art. The work has been executed by Mr. Fish, under the directions of Mr. Wimperis, architect, Sackville-street.

A SURVEYOR OF THE TIME OF QUEEN ELIZABETH.

THE position of the modern surveyor, his connection with the architect, his exact duties, and the somewhat vexed question of quantities, have all been matters which have received much attention within the last few years. We do not wish in the present remarks to discuss any of the above points, but to bring under the notice of our readers a remarkable little volume, published at the commencement of the 17th century, and which we believe is among the earliest complete expositions of the practice of surveying in the English language. The book in question is a small square quarto of 268 pages, entitled in the quaint, semi-prefatial fashion of the period, "The Svrveiors Dialogve, very profitable for all men to pervse, but especially for Gentlemen, Farmers, and Husbandmen, that shall either haue occasion, or be willing to buy, hire, or sell Lands: As in the ready and perfect Surueying of them, with the manner and Method of keeping a Court of Suruey with many necessary rules, and familiar Tables to that purpose." Our copy which is "Printed by Thomas Snodham" in 1618 at London, is of the third edition. The title page bears the name of the author in initials only ("I. N."), but the Epistle dedicatorie to the right Honourable Robert, Lord Cecill is signed "Io. Norden," and is dated "At my poore house at Hendon, 27. Martij. 1610." The somewhat lengthy "Epistle to the Reader" is signed "Yours, I. N.," and concludes with the quotation from Eccles. vii., 13, "Wisedome is good with an inheritance." This epistle is followed by a short poem—surveyors were poetical in those days—"*The Author to his Booke.*" Then comes a Latin quotation, "Inuidia sibi et alijs venenum," and finally we have the table of "The Contents of the sixe Bookes." It may be interesting to glance briefly at these "bookes," and to describe the treatment of his subject pursued by the author, who was evidently well versed in all branches of surveying, and who appears to have possessed many of the instruments and appliances still in use.

We can trace only the most meagre account of Norden's life.* He hints in his dedication that ours is his second work, and we find from "Lowndes' Manual" that he published in 1593 the first "parte" of "An historicall and chorographicall Description of Middlesex," small 4to., which was dedicated to Queen Elizabeth, with an address to Lord Burleigh. Subsequent issues of this work appeared in 1594-6, and 8, containing various maps and descriptions of the English counties. Our author seems to have drawn many of the maps for the 5th edition of Camden's "Britannia," published in 1607, and Lowndes tells us that the father and son obtained a patent from King James I. in that year as joint officers of H.M. Crown Lands. It seems that in the same year the first edition of the "Dialogve" was published, consisting then only of five books and 244pp. The second edition, which appeared in 1610, contained a "sixt booke newly added," while we learn from the same authority that the third edition, of the year we have already named, was dedicated to Sir R. Smith, Surveyor of London. No such dedication appears in our copy, so Norden perhaps made the edition of 1618 serve two different purposes by the change of the Epistle dedicatorie. Strangely enough a fourth, and apparently a last edition, was printed 120 years later, in 1738.

Thus much on the history of the work before us, and now to a brief examination of its contents. The first book deals with the necessity of the surveyor both to the "Lord and Tennant." It is headed "A Surveyors dialogve betweene a farmer and a Surveyor." In order to distinguish between the answers of the surveyor and the questions of the "farmer," the "lord of the manor," and the "bayly," to whom we are successively introduced, the queries are in all cases printed in black letter, the replies being in plain type. Early writers were very fond of the dialogue form, and Norden seems to have taken great pleasure in it. The farmer he encounters appears to have entertained a very poor opinion of surveyors in general, for he is made to say, "I have heard much euill of the profession, and to tell you my conceit plainly, I thinke the same both euill and unprofitable." The author endeavours at some length to disabuse his companion's mind of his prejudice against surveyors, which arose mainly from the idea that surveys had the effect of raising the value of land and property. The farmer states his case thus: "You pry into mens Titles and estates under the name (forsooth) of Surveyors, whereby you bring men and matter in question oftentimes that would (as long time they haue) lye without any question. And oftentimes you are the cause that men loose their Land, and sometimes they are abridged of such liberties as they haue long used in Mannors: and customes are altered, broken, and sometimes peruerted or taken away by your meanes: And aboue all, you looke into the values of mens Lands, whereby the Lords of Mannors doe racke their Tennants to a higher rent and rate then euer before: and therefore not onely I, but many poore Tennants else haue good cause to speake against the profession." The surveyor argues that it is far better for all parties that the lord of the manor should have accurate and complete knowledge both of the value, the area, and the tenure of his property, otherwise officious informers might give him false and exorbitant notions of his estates, and cause him to raise unduly the rentals. Having convinced his interrogator on this score, he is next attacked with respect to the great increase in the fines which have been imposed after recent surveys. The surveyor proves that this is reasonable, when it is remembered that the values of money and every commodity which it will purchase have vastly increased since the time that such fines were first instituted. He gives as an instance a quotation from "Stow's Chronicle," showing "that a quarter of wheat was sold at Royston, in Hartfordshire, for twelvepence" in the time of "Henry the Sixt," and says our surveyor, "I trust, if you be a Farmer, you are a corneseller, and I thinke, if a man offer you thirty times as much for a quarter, you will say it is better worth." The farmer is at a loss to what cause to attribute this strange change in values while farmers had become poorer than ever. Friend Norden deals him a hard blow by assuring him that "the reason is manifest: for where in those daies farmers and their wiues were content with meane dyet and base attyre, and held their children to some austere gouernment, without pride, haunting Ale-houses, Tauernes, dice, cards, and vaine delights of charge, the case is altered: the Husbandman wil be equall to the Yeoman, the Yeoman to the Gentleman, the Gentleman to the Squire, the Squire to his superiour, and so the rest, eueryone so far exceeding the course held in former times that I will speake without reprehension, there is at this day thirty times as much vainly spent in a family of like multitude and quality, as was of former ages." After this serious charge against the unlucky farmer one would think he would give in, but he is allowed one more attack on the craft, and this time he deals with "vnskilfull" surveyors, and finds fault with their numbers. He says, "I wish there were fewer, and they honest, iust, and skilfull: for to tell you truely, we haue thought among us Countrymen that there are more then can be imployed, as it seemeth by their publique declarations of their want of worke: for as I haue passed through London, I haue seen many of their Bills fixed upon Posts in the streetes, to solicite men to affoord them some seruice: which argueth that either the trade decayeth, or they are not skilfull that beg imployment so publikely: for, *vino vendibili suspensa hedera non est opus.* A good workeman needs not stand in the streetes or market-place." ("Good wine needs no bush" seems not to have been an English proverb at that time.) The surveyor admits the truth of this, and shows that the art of the surveyor consists of many branches, and that he who can only measure and cast up land-areas is not a surveyor, neither one who can delineate the same; but he must further have "the vnderstanding of the Latine tongue, and have some sight in the common Lawes, especially of Tenures and Customes, and must be able to reade and vnderstand any ancient deeds or records, French and Latine, and to iudge of the values of land, and many other things." He next proves the antiquity of the profession, and shows that it is often alluded to in Holy Writ, that it must have existed in England at the time of the compilation of Doomesday Book, and that "the art hath beene in summe and substance established by acte of Parliament, and called '*Extenda Manerij.*'"

* He is "supposed"—it is said in the "Dictionary of Artists of the English School"—"to have been born in Wiltshire in 1546. He was educated at Oxford, and took there the degree of Master of Arts in 1573."

The remainder of the first book treats of the nature of the particulars upon which a survey is based—the lord's records, and the information of the tenants; the most aged inhabitants, and the youngest, are cited as the fittest to accompany the surveyor in his perambulation—the former to aid him with their remembrance of byegone times, and the latter to be enabled to "giue like ayde by their experience to posterities." We find that the lord of the manor has the right of convening his tenants every three weeks, though the custom had fallen into disuse; and our author gives some curious particulars of the duties of tenants, among others that they are bound "to giue their best aide to the Surveyor, to trauell with him about the Circuit, Buts, Bounds, and limmits of the Mannor, to informe him of the same, and of euery particular mans Land, and Rent, and to shew him their copies, leases, and deeds, to the end he may enter and enrole them all together in a faire book, for the Lords vse." He shows that tenants are far freer than in former times, for they were once in much greater bondage, and performed many servile works, as he says in most of their copies and deeds is expressed in these words: "*Pro reditu & servitijs inde prius debit, & de iure consuet.*" In the second book we have a "dialogve betvvene the Lord of a Mannor and a Surveyor: Wherein is intreated of the State of a Mannor, *of the parts and profits thereunto belonging*: and how the Lord of a Mannor ought to deale with his Tennants." Here again we find much curious information, couched in the most quaint and delightful language. We learn what constitutes a manor, and who may or may not keep a "Court Baron." Then we have the different classes of tenure—freehold, copyhold, and customary land; the various kinds of rent—"rent-seruice, rent-seck, and rent-charge." Next follows a definition of fines, and the nature of an "amerament," a "heriot," and a "relieife." The measurements and divisions of land which are ther explained seemed to vary much in different counties, but Norden tells us "a *carue* or *plow-land* containeth 120 Acres: euery hide of land 480 Acres, and euery *Knights* fee 1,920 Acres. But after some computation a Knights fee containeth fiue *hydes* of land, euery *hyde* foure yard land, and euery yard land twenty-foure Acres, after the common account: In *Shippon*, in *Barkshire*, they haue a hide of Meadow, and that containes tenne Acres. Two *Knights fees* make one *Cantred*, which after the first computation amounteth to 3,840 Acres. Sixe *cantreds* $\frac{1}{2}$ maketh a *Barony*, 25,600 Acres, whose reliefe is 100 marks. One *Barony* $\frac{1}{2}$ make an *Earldome*, 38,400 Acres, whose reliefe is 100 pound." Elsewhere we read that each hide contains 4 plough lands, and every plough land or carue is 4 yard lands of 30 acres. Half a yard land in the west of England is called a cosset, and half a cosset is a mese, or 7½ acres. The rest of the second book is taken up with an explanation of "forfeitures, wayues, escheats, and perquisites," minerals and sundry benefits, a long dissertation on wards and church patronage, and the characteristics of a good landlord.

Book III. is, upon the whole, the most interesting of the series, though we cannot afford space to quote from it. Its title is, "The Svrveyor's Dialogve betweene the Farmer and Svrveyor: wherein is shewed the manner and method of keeping a Court *of Suruey, with the substance of the Charge, and the* Articles to be inquired of, how to Inroll Copies, Leases, and Deedes, and how to take the Plotte of a *Mannor*." From one of the paragraphs it appears that the chain then used measured 3 poles or 49ft. 6in., instead of the 4-pole chain now employed. We learn also the use of the "plaine-table," the "Theodelite," and the "Circumferentor."

In the fourth book we come across the "Bayly" again, and find many curious tables. For some of these the author expresses his obligations to previous writers—viz., Randolph Agas, Valentine Leigh (or, as he spells his name, Lea), and M. Digges. We have also a reference to an obsolete land measure—a "daies work"—which, it seems, was the tenth part of a rood, or four perches.

The fifth book, "shewing the different natures of Grounds, how they may be imployed, how they *may be bettered, reformed*, and amended," has more interest from a farming point of view than otherwise. It abounds with the quaint old hypotheses and fallacies we find in the works of that date, and is very amusing reading. Among other curious items of information we read therein that there were at that time in Sussex alone "neere 140 hammers and furnaces for Iron."

Finally, we have in the sixth book "a briefe conference betweene a Pvrchacer of Land and a Svrveyor: *Wherein are some points necessarie to be* considered, of such as are able and willing to Purchase Land in Fee-simple, or by Lease." The greater part of this book is taken up with an argument in favour of buying a lease for 21 years, rather than purchasing a freehold, for persons with a small capital to invest. We find our author sets down 7 years' purchase for a 21 years' lease as the regularly understood price, 13 years for a 100 years' lease, and 16 years' purchase for a freehold. These estimates are curious. He also gives a summary of the points to be considered in buying an estate. The work ends, as it began, with a Scriptural quotation, Proverbs xvii., 2: "A discreet seruant shall haue rule ouer an vnthriftie Sonne."

We may add, in conclusion, that Watts, in his "Bibliotheca," after recounting a long list of works of a devotional character which appeared in various years between 1585 and 1626, by a certain John Norden, of Hart Hall, Oxford, states: "It is doubtful whether this author is not the same as the following," when he proceeds to describe the topographical publications of John Norden, which cover, as we have seen, the period of from 1593 to 1625.

OLD HOUSES IN WARWICKSHIRE.*

FEW counties in England can compare with Warwickshire for the richness of its remaining examples of domestic architecture, especially those of the Elizabethan period, and although Mr. W. Nevin has only recently published his book illustrating "Old Worcestershire Houses," we can but welcome his companion volume now before us under the above title. The work contains thirty-one plates, royal quarto size, of well-executed etchings, consisting for the most part of exterior views, though a few interiors are given, and two or three plans are included in the series. The value of the book would have been materially increased had more plans figured in the list, and one or two of the present plates might well have been sacrificed. It is not by any means an easy task, however, in most cases to secure dimensions and obtain particulars as to which parts are alterations upon the original plan, so as to show correctly the work of those who "Building royally their mansions curiously" seldom failed to give a charactor to their plans. With the architectural details of the elevations and interiors it is different, as their dates may generally be determined upon and permission is most easily obtained to make sketches for the purposes of publication. The descriptive letter-press accompanying the drawings, without making claim to being more than a collection of architectural notes personally made, not only has the merit of conciseness, but is by no means devoid of biographical and topographical interest. The aim of the author has advisedly been to give information not furnished elsewhere—and on the whole his remarks are well considered and to the point. The execution of the plates evinces great care and much ability, though as etchings from an artistic point of view they scarcely rise to a comparison with the works of Ernest George and other well-known etchers. They are, however, more detailed, and architecturally correct, having a crisp and precise touch, often catching the spirit of the old work represented in the drawings. The contents are divided into five parts, these being under the Hundreds of Hemlingford, Knightlow, Barlichway, and Kineton, with the county of Coventry. Six plates, including the frontispiece, are devoted to Aston Hall—a subject well worthy of the space, though having scarcely the character of detail which we should wish to see repeated. The entrance doorway might be named, perhaps, as an exception, though not illustrated in detail in the book before us. A large drawing was given in the "A. A. Sketch Book," vol. 10, plate 2, 1876 and '77, and a series of measured details appeared in the first volume of the "Birmingham A. A. Sketch Book"—if we remember rightly. The general massing of the entrance front is certainly stately in effect. We cannot agree with Mr. Nevin, however, that "the design is effective in the extreme." The three towers, for example, are too equal in height and parts, each competing with the other and neither giving emphasis to the composition as a whole. The mansion is now used as a museum, and the south wing as a residence of the curator. The hall is very much spoiled by the monstrous animals whose not very shapely stuffed skins have been added to the museum, and Mr. Nevin has carefully delineated their proportions greatly to the detriment of the scale of the hall itself. If the liberty of leaving out the conservatory, when drawing the west front, be permissible, surely the omission of a rhinoceros or a giraffe in the hall would have been an advantage. The chimney-piece in Lady Holte's drawing-room is a feature rather earlier in character than the rest of the work, and seems to have been brought from Duddeston, where the family formerly were seated. It is here drawn to ¾ inch scale, and is of freestone in the jambs and lintel, enriched with columns, panels, bosses, and obelisks of black marble, the upper part being of alabaster. In the panel over the chimney-piece in the hall is the following inscription:—

"If service be thy meane to thrive
Thou must therein remaine
Both Silent, Iust, and True
Content to take some paine.
"If love of Vertue may allure
Or hope of worldly gaine
If feare of God may thee procure
To serve doe not disdaine."

From the similarity of parts of Aston Hall with that at Crewe, Mr. C. J. Richardson considered that both houses, as well as Dorfold Hall, were the work of one and the same architect.

Plate 7 gives a view of Castle Bromwich Hall, of which a bird's-eye view, dated 1726, is given in Dr. Thomas's "Dugdale," showing the building much as it remains at the present time. History tells that Edward, son of Walter Viscount Hereford, "built a fair house of brick here, wherein he resided; and being created baronet 25 Nov., 10 Jac., departed this life 22 Sept., 20 Jac." In 1657 it passed into the Bridgeman family, and now is the property of the Earl of Bradford, being occupied by Viscount Newport, M.P. The front is rather spoiled by the balustrade, but altogether the effect is good, and the detail, though less elabo-

* Illustrations of Old Warwickshire Houses. By W. Nevin, Architect. London: Chiswick Press.

rate, is better than that of Aston Hall. Grimshall Hall, in the parish of Knowle, is an interesting example of a half-timbered manor-house of the middle of the 17th century. Unfortunately the building is covered with stucco, excepting the gables, where the timbering is massive and good. The porch roof is curious, and the little projecting bay windows have been often copied lately. A drawing of the splendid example of wrought-iron work to the sign-board on the inn near the church at Knowle would have been interesting, but Mr. Nevin fails to name it. Of a moated manor-house, in exceptionally good preservation, we have Baddesley Clinton (10 and 11). It is situated in a thickly-wooded park, and seems originally to have formed a quadrangle, of which three sides now remain, while the moat which surrounds the building is spanned by a modern bridge of suitable design. An exceedingly happy etching is Mr. Nevin's view of the chimney-piece of later date, in the hall, though the detail of the freestone carving is rather obscure, probably due to the fact of its being, at the best, but in a reflected light, the flood of light from the window being at the side, and this same reason may account, perhaps, for the absence of any drawing of the fire-place in the gate-house to Kenilworth Castle, of which Mr. Nevin gives rather a wiry and cold drawing, plate 20. An illustration from much the same point of view was published in the Building News for May 31st, 1878, by F. W. Richardson. The elaborate mantel-piece there is not in its original position, and its dark oak carvings are with difficulty seen. Kingsbury Hall (plate 13) may be interesting from an archæological point of view, but as an example of architecture it is scarcely worth notice, while the quaint grouping of the roofs is by no means made the most of in the flat perspective before us. Pooley Hall and the little view of Mancetter Manor (14 and 15) are better; while Astley Castle and Weston Hall are simple and good (16 and 17). We wish the simplicity of the latter were more often taken as a model for our smaller country houses; the windows, however, in the gables are rather high. Combe Abbey (18), one of the seats of the Earl of Craven, is a curious instance of an Elizabethan house grafted on to monastic buildings of the Norman and Perpendicular periods, with later additions attributed to Inigo Jones, and reconstructions of late years by Mr. Eden Nesfield, who began an extensive scheme for the rebuilding of the mansion for the Earl of Craven, in 1864. Richardson and Nash give drawings of a porch, now destroyed; and the former devotes a plate to one of the fire-places. The smoke cowls to most of the chimneys may be truthfully drawn in Mr. Nevin's view, but they do not improve the building. Addison's house, Bilton Hall (19), near Rugby, is a charming old house, with hedges of yew in the well-kept garden, where every variety of foliage enriches the place, and renders it just the sort of house where one would elect to pass the closing days of one's life. Perhaps the best etching in Mr. Nevin's book of "Old Warwickshire Houses" is of "Cæsar's Tower, Warwick," entirely an example of military architecture, but inasmuch as it is just the view which is the most strikingly impressive, and moreover one which has baffled photographers, we are glad to have the really fine drawing included in the domestic series of works before us. The tower is one of the most valuable and perfect specimens in the kingdom, remaining almost entirely in its original state, with its bold machicolations above and battered walls below. The Priory at Warwick (23) is made the most of (see our lithographic reproduction to-day), and the very interesting house at the bottom of the town, known as St. John's Hospital, but now a ladies' school, is done ample justice, by Mr. Nevin's view, in plate 24, where the later date beautiful gate of wrought-iron work is carefully shown. To the rear a good view of simple grouping is to be obtained, but the architectural features are chiefly concentrated in the front. Wroxhall Abbey is briefly described, but of course it has been improved away to make room for the rather vulgar and very Gothic red building erected not long ago from designs by Mr. Scott, we believe, of Liverpool. The house contains a theatre in the basement, if our memory serves us rightly, and there is a splendid old bedstead in one of the bedrooms, which we have had the advantage of seeing. Would that Mr. Nevin had given us a drawing of it, but he fails to name its existence. The remaining conventual church, with its interesting brick tower and beautiful oak screen, stands close to the house, and should be named for its own sake as well as an example of clever restoration, the work of Mr. Garner, architect (Bodly and Garner). The "fayre maunour place moated at Coughton," now known as Coughton Court, is illustrated by plate 24, which gives a view of the old gate tower, with its fine windows, which, however, seem rather overdone for such a position. The well-known mansion of the Lucys—viz., Charlecote—figures in two sheets (25 and 26), one of which gives a general view from outside the gate-house, a work of great beauty, and the other a detailed sketch of the entrance porch—an example familiar to all students of English art. It is attributed to John of Padua, and details are given both by Richardson and Nash. Mr. John Gibson added a wing to the house, and the church hard by was erected a few years ago from his designs. The mansion contains a fine collection of family portraits and paintings. In the hall is an old oak sideboard, of 1558 date, and a table with mosaic of jasper, lapis, breccia, &c., from the Borghese Palace. The staircase is an original one of oak, and the library contains a fine suite of chairs, couch, and cabinets, from Kenilworth, of Coromandel wood, inlaid with ivory, said to have been given by Queen Elizabeth to the Earl of Leicester in 1575. The woolwork backs and seats of the couch and chairs were recently executed by the late Mrs. Lucy, we believe, with the assistance of Sir Digby Wyatt, and they evince considerable variety of design as well as harmony of colour and beauty of workmanship. The summer-house or pavilion (reproduced by us to-day), from Coleshill Park, re-erected in the garden at Lower Ettington, is carefully and well shown by plate 27, and some particulars are given of the manor house, which was almost rebuilt by the present proprietor, Evelyn Philip Shirley, Esq., between the years 1858 and 1862. The pavilion is a handsome specimen of what has been called "quaint Classic" of the seventeenth century, and bears the Digby crest in the centre of the frieze—an ostrich holding in its beak a horseshoe. Little Wolford Hall has a good drawing in sheet 28, and the two following plates illustrate the mansion at Compton-in-the-Hole, now known as Compton Winyate, and as a subject often illustrated is familiar to most of us. The book closes with two views from Wormleighton, and we congratulate the author on his work, though certainly the half-timbered buildings of Coventry and Warwick deserved more attention. Perhaps, at some future time, Mr. Nevin may be induced to take the subject up again. The present volume, like that of the "Old Worcestershire Houses," was published by the Chiswick Press by subscription, but had its publication been more generally known, we think many would have procured a copy who now may have no opportunity of doing so. The title page of the book is quiet and good—quite in the spirit of an old example, and the book is well printed and bound.

ARCHITECTURAL MISREPRESENTATION.

Architects admire and copy the works of the ancients and the mediæval builders; many affect to believe in the art teachings of Ruskin, yet with singular perversity we find modern practice departing from such high precepts every day. We have heard a great deal of late about shams and dishonesty in design, though it is somewhat strange that many in the profession adhere to modes of practice equally reprehensible. At the present moment we may instance several infractions of what we may term the ethics of high art. Among these we may mention the questionable or divided authorship of buildings, or the nominal use of well-known artists' names. Many designs in furniture and decoration that have been credited as the works of some of our best designers are known to have had no connection with them, or the relationship has been of a very remote kind. But when the public are beguiled into the belief that such and such a house has been built from Mr. So and So's design, when actually it is not the case, there is something more to be felt than pity for the duped one. One feels vexed to think not only of the ignorance and want of discrimination of the victim, but of the hollowness and falsity of a system which allows one man's brains to be credited to another. We believe this kind of misrepresentation is on the increase, and that building speculators, estate agents, and others possessing tact and acuteness, are making money thereby. It is easy, for example, for Mr. Go-by-Name to traffic upon the reputation of a well-known architect, or even to get the latter to lend his name for a sufficient douceur or *quid pro quo*. The latter supplies the former with a sketch, or merely with the elevations of one or two houses; or the thing may be done in even a simpler manner in the nature of a mutual understanding of some sort. The intrigue "takes," or is successful for a time, the houses all let or sell, and the lucky leaseholder gets his estate covered, in spite of sundry sanitary omissions. It must always be assumed, however, that Mr. Go-by-Name has a credulous *clientèle*, who have huge faith in conventional etiquette and fashion. Common sense is scarce among such people, and if they can boast that their furniture or house has been designed by a well-known architect they are happy. We know of cases where cunning builders have got plans from respected architects, and have so completely garbled the design that the individuality of it has been ludicrously lost; and we have seen of late a few glaring instances of features so altered from the original intention as to have become positively caricatures. Now this mischief is the result of the system we are exposing. That it is doing an irreparable injury to real art cannot for a moment be doubted; but the most singular thing is that not a few architects, who enjoy a high reputation, are lending themselves to this sort of jobbery. One of the most frequent ways in which the architect's intention is contravened consists in the employment of another and inferior material to that proposed—such, for example, as the use of cement for moulded brick, wood for stone, and iron for the latter material. The transposition of a different material is itself enough to produce a most flagrant misrepresentation. We may just instance the employment of concrete for stone in the small mullions of windows; and the equally outrageous practice of our Yankee friends

in substituting metal cornices and ornaments for wrought stone. It is doubtless true that the architect is to blame in not recognising these more facile materials, and in boldly taking the bull by the horns; but as he prefers to reproduce old models he should unswervingly see that his designs, or rather imitations, are faithfully rendered, both in letter and spirit.

There is, moreover, another point of view from which this class of dissimulating art must be viewed. It is unjust to those who cannot afford to risk their reputation. Architects are much in the same position as tradesmen: those who have the largest establishments get the lion's share of custom, but there is this fatal difference in the case of art—namely, that the architect of large practice cannot possibly pay individual attention to his undertakings, and, whereas a manufacturer can divide his labour with great advantage to the public, the artist cannot. But still the old adage, "To him that hath shall be given," remains in force, and as long as it prevails people will be found silly enough to pay for a name only. In house-building it so happens that the entire merit of design rests with the plan and those details of fitting and embellishment which go to give it a character. We defy any artist to impress a character upon an executed building of this kind by supplying a mere sketch or set of elevations, for we have seen buildings, purporting to be the work of well-known R.A.'s or R.I.B.A.'s, from which those worthies would shrink in disgust. As long as our architects foster vicarious art, which they must do by accepting so much work that they cannot efficiently perform it themselves, this state of things will continue. It is a pity, indeed, some of Mr. Ruskin's precepts are not heeded more by the profession, particularly those which insist on the value of personal labour. But what need have we of precept when the history of art furnishes such striking instances of defection and rapid decline as that which followed the decay of the Roman empire, or that which took place just after the Renaissance in England and most other countries? Have we a better proof of individual care than the work of the mediæval builder and artist, whose every detail we so painstakingly copy? We should like to know how many details in Gothic churches and Queen Anne houses receive the individual attention of the designer. Are they, indeed, ever looked at, or drawn out full size, by the artist himself? The latter labour would be impossible in most cases. But the system of vicarious designing and expert copyism which has sprung up within the last century has favoured the mischief. Government has sanctioned it in the departments of public works; we have wheel within wheel, and the artistic Copyright Bill dreamed of by Lord Redesdale has not come to anything. Even that Areopagus of Art, the Royal Academy, has wofully degenerated since its foundation in 1768. At that period do-nothings and busy-bodies, and a host of hum-drums, had no admission within its walls: it consisted of real working artists. What can the word "honorary" have to do with art? It is really a word only lately coined to designate the idleness or ignorance of modern art professors. Again, what constitutes membership of that august body? The union of architect, painter, and sculptor, it is true, has passed away as far as modern art is concerned, and the architect now associates with himself the sculptor, painter, glass stainer, mosaicist, and metal worker, but this division of labour should make it more possible for every artist to do his work more thoroughly and to engage in it personally. As long as the idea prevails that architecture is a kind of dilettante profession, and that the drudgery of designing may be consigned to subordinates, so long will irresponsible art be the result. In spite of the defects of the academic routine of the "Ecole des Beaux Arts," the French system of education scarcely leaves room for this conception of architectural practice. The student of the leading school enters one of the Government schools of design, where he is taught drawing, geometry, &c.; he next enters an *atelier*, where he prosecutes the study of design under a professor, after which he passes an examination at the above school; he soon begins practical work, for which he passes another test, and details form an important part of this training. The practice of revived styles has much abetted the custom of delegating design, simply because the qualifications for this sort of work is expertness in copying, and it is instructive to observe how closely the designs of certain leaders of style are followed. Notwithstanding this, there are broad distinctions of treatment, and we observe important differences between the work of one or two leaders and their followers. In the former case the style is handled in a pleasingly simple manner—there is a *negligé* character, but without confusion; in the other there is evidence of immense effort, a jumble of features, and an incoherence of parts which at once distract and bewilder.

Thus we see that architecture, like other pursuits, is pervaded by humbug. It has among its ranks those who not only accept illicit commissions but who impose on public ignorance and credulity; it has some who accept commission for performing but half the duties of the architect, leaving the remainder to delegates, and it has a few who never see their own work executed, who are, nevertheless, willing to receive all honour if it be due. The only remedy for these anomalies and wrongs constantly coming before us is a higher personal regard for the duties of the profession, and a more honest acknowledgment of its responsibilities.

KING WILLIAM'S COLLEGE, ISLE OF MAN.

It is not to be wondered that the reputation of King William's College in the Isle of Man should be rapidly increasing, for it possesses three qualifications certain to produce success. The education is good, and those who leave this school are making a name for it at the Universities; the cost of education is small; and the situation is probably the most healthy of any of the public schools of England. And this latter feature is one of great importance in these days, when sanitary reform is so wisely urged on by men of knowledge and experience; nor, indeed, can salubrity of situation be at all over-valued in its beneficial effects on bodily and mental health in the present and in the future.

King William's College stands close to the sea—nothing but the playing field and a road divide it from the shores of the Bay of Castletown. The site, moreover, is very dry; there are no masses of trees around to produce dampness in the atmosphere during the autumn months; and the breezes can sweep across the level country, which is backed by the hills which descend steeply on the opposite sides of the island down to the shores of the Irish Sea. Just in front of the college above the shore, half a mile from the quaint old city of Castletown, rises a small mass of ruins which mark the site of Hango Hill, so that the college stands pretty nearly on the spot where the strong-minded Charlotte, Countess of Derby, caused the unfortunate William Christian, Receiver-General of the Island, to be executed in 1663 for surrendering it to the Parliamentary forces—an incident which is probably best known to most from the manner in which Sir Walter Scott has interwoven it into the true-love struggles of Alice Bridgenorth and Peveril of the Peak.

But we must leave the tales of Sir Walter for the facts of to-day. The college was founded in the year 1830, and in the year 1833 began its work, so that it is essentially one of those schools of the Victorian era, which, it is obvious, form so noticeable a social feature of the present century.

Some of the students are day boys, but the large proportion—at least one hundred and eighty—are boarders, and of these some hundred and twenty reside in the main building, where are the class-room, head master's house, and all the principal offices, and from any spot in the south of the island the tower of the college is a noticeable landmark. The main building is a gray stone structure 210ft. in length, whilst in the centre rises the tower, of which mention has already been made, 115ft. high, and from this centre, at right angles to the line of front, runs back what was formerly the chapel, but is now being rapidly transformed into a library and class-rooms, and dormitories. This part is 135ft. from the front of the main building to the further end. At the western end of the main front is a further building, added some years ago, which has given additional accommodation, but somewhat detracts from the general outline of the college

The building is partly in the Early English style and partly in a style of later Domestic Gothic; but the whole design of the building, both in general form and detail, is wisely simple. Indeed, we consider the main building of King William's College quite in harmony with its academic objects and with the country in which it stands, and in itself well proportioned; and when all the reforms now in progress are completed, and especially the proposed entrance hall in the centre under the tower, the building will in all respects be still further improved. Internally its main drawback is the want of good light passages, but the class-rooms and other places are thoroughly well suited to the purpose for which they are required. The dining-hall is, perhaps, the most noticeable room; large and well lighted, facing the sea, nothing better could be needed. But it is to be hoped that sooner or later the sick-rooms, which are, as might be supposed, rarely used, w ll be taken from the main building and placed on some adjacent spot. It is of course difficult to get such rooms isolated, and yet not be in a separate house, but we are strongly of opinion that in every public school the infirmary should, if possible, be separated from the main body of the school buildings, for it is difficult, even with the most perfect care, to guard against the spread of disease when the sick are in the same building with the healthy. The difficulty of course is that all these Victorian schools, though of such a progressive character, are yet so comparatively small as compared with Eton and Harrow, that in their beginning it would have been too ambitious a scheme to lay out the buildings with a view to anything like a widespread or serious illness.

We have already said that the old chapel is being rapidly transformed into a purely scholastic building, and in place of it a new chapel has been built at the south-eastern angle of the main building from the designs of Mr. Picton, the well-known architect, of Liverpool. The structure is now, with the exception of a few of the internal fittings, ready for use, and is a distinctly valuable addition to the school buildings, though, at the same time, it is not architecturally successful as regards external form. It consists of a nave, a small chancel, and an ante-chapel, rather than a porch, since this latter part is an oblong erection, placed at the end of the chapel, with the door at the side. The unfortunate part of the plan is, however, the huge and weighty roof, which is out of all proportion to the height of the walls and the size of the chapel. If modifications have been introduced into the original design by those for whom the work has been done, this mistake is rather the misfortune than the fault of the architect. In all ecclesiastical buildings it is the roof which is usually the most difficult part of the work, to render harmless as regards the beauty of the general plan, and when the building in question is a small chapel of an undecorated style of architecture, on ground quite bare of trees, so that there is nothing to break the sky line, and thus hide the roof in any way, it must be confessed that this latter part of the building is very full of difficulties. But when it is

of a size out of all proportion to the walls, and when from a distance of a quarter of a mile it is the only part of the building which is visible, it causes a feeling of regret that the landscape should have been disfigured by such an architectural blot, even though internally it may be commodious and well planned. For the large wooden roof inside, the easily-attained seats and the general breadth of the whole of the arrangements are carefully and skilfully designed. For in a school chapel there is nothing more important than that the boys should all be plainly seen; as the saying runs, "Boys will be boys," and if there are screens and similar adornments they only afford shelters behind which all sorts of clandestine tricks are perpetrated. In the new chapel which we are noticing the lowness of the seat-backs and the general flatness of their arrangement will allow the masters to have the whole chapel spread before them like a map. Another feature, however, to which we are inclined to take exception, is the windows; for whilst the windows of the tower of the part of the building which formed the old chapel are lancet-shaped, with single lights, those of the new chapel are round-headed, with double lights, being thus of quite a different character to the main portion of the building, because it is the tower dominant over all which indicates the style of the buildings to the beholder, and it is this style which should have been followed in the building of the new chapel. For we take it that it is best, assuming that the larger and main and older parts of a block of buildings are of a distinct character, that the additions should be in the same style, even if it be possible to erect a building which by itself in another style will be more beautiful. For otherwise the general architectural harmony of the whole is utterly broken. But these criticisms apart, Mr. Picton has certainly added a most commodious building to King William's College. It is unnecessary to go into further details in respect of the minor arrangements of the school buildings; we should have been glad to have seen a better system of studies and bath-rooms, but no doubt the proximity of the school to the sea renders these latter less necessary than in a spot where water is not so accessible in its oceanic abundance. A bath could easily be moored at a convenient distance from the shore, in a sheltered spot, and it would be then available at all times of the summer for practice in swimming. But, as we have already said, everything cannot be done at once, and the success which has attended King William's College for nearly fifty years since its opening, and the progress which it is yearly making, plainly indicate that its usefulness is certain to increase and to be yet more appreciated in the future.

ELECTRIC LIGHTING IN PARIS AND FOR THE CITY OF LONDON.

MR. WILLIAM HAYWOOD, the engineer and surveyor to the City Commissioners of Sewers, has made a detailed and discriminative report to the streets committee of that body on the electric light as in use in Paris, and more particularly on its adaptability for use in the city of London. The Jablochkoff candle is the only form of light referred to, and this is now being exhibited in the Avenue de l'Opéra and several of the principal squares of Paris, and at some of the chief hotels, shops, and workshops in that city. The most important of the public lighting experiments at Paris is that in the Avenue de l'Opéra. The thoroughfare is 980 yards in length, including the Places de l'Opéra and du Théâtre Français, and is lighted from sunset to midnight by 52 electric lamps, containing in all 64 candles, each nominally equal to 100 gas burners. The contract for lighting was to have expired on the 15th inst.; it has since been extended to the close of the Exhibition, and the municipality is now considering the extension of the contract until the end of the present year. Mr. Haywood pronounces the effect as brilliant in the extreme; figuratively speaking it was light as day. There are no shadows to speak of, and it is practicable to read almost anywhere. It could scarcely be otherwise, indeed, with light nominally equal to 6,400 gas-burners in a thoroughfare not three-fifths of a mile long. With this illumination Mr. Haywood contrasts that of London, remarking that in the whole City there are but 3,050 gas lamps, and though here the gas is of higher quality than in Paris the main thoroughfares of that city are, as a uniform practice, until midnight much more brilliantly lighted than those of London. If the only object of street-lighting is security for traffic this avenue is, in the writer's opinion, lighted vastly in excess of reasonable requirements.

Proceeding to criticise the character of the light Mr. Haywood observes that by it tints can be distinguished almost as well as by daylight, and it will therefore be useful for market illumination. The comparative absence of heat is another good quality, and will increase its value in places where large numbers of people are congregated. He suggests that investigations ought to be made into the correctness of the assertion that the products of combustion are harmless; that the electric flame does not exhaust the atmosphere of oxygen, like coal gas, cannot, he says, be doubted. He does not regard the automatic and instantaneous lighting and extinction of lights as of great importance, although advantageous in public lighting. As to the relative intensity of electric and gas lights, it is pointed out that the standard for street-gas at Paris is but twelve candles against the sixteen required in London, and that the opalescent globes necessary to diffuse the too-intense glare of the Jablochkoff candle reduce the light by at least 50 per cent. He found that the electric lights varied considerably in intensity, the lessening of power being as much as from one-third to one-half, and occurring at some lamps even to three or four seconds. The volume is, however, so great that even this extent of flickering does not necessarily affect the comfort of persons reading by the light; but the variations indicate that the system cannot yet be considered perfect. The colour varies, with the degree of intensity, from nearly pure white to one faintly tinged with blue, and where found objectionable, can be modified by using coloured glass globes. For street-lighting, however, the question will ultimately resolve itself into one of cost, and in deciding the relative economic values of the gas and electricity there is at present a very great difficulty. Gas presents advantages in divisibility, and the ease with which the supply can be regulated.

The report concludes by a consideration of the applicability of the electric light for street-lighting in the City. For this purpose it will first be necessary to find situations for the steam engines and Gramme machines, either on vacant ground, or in basements and vaults. The wires can be as readily laid beneath the foot pavement, and the lamp-posts as easily utilised as in Paris. If kept alight till midnight only, it is possible that one man could attend to each engine in a thoroughfare, and arrange for the transfer of the electric current to fresh candles every hour and a half. A workman during the daytime would have to replace the exhausted candles, and clean the lamps. The question of the amount of light which should be given would require careful consideration as well as the hours during which it should be used. The possibility of accident to the motive engine and Gramme and the consequent extinction of all lights supplied by it, would have to be provided against by having auxiliary apparatus ready. Considering, therefore, that at present the electric fluid cannot be efficiently transmitted a greater distance than 1,000 yards from a station, and the expense of providing stations, steam engines, electrical machines, and attendants, Mr. Haywood does not think it probable that the electric light will compete in point of economy with gas. There are houses and places where the large traffic might justify its use during the busiest hours of darkness, such as by the King William statue, in front of the Mansion House, Ludgate-hill-circus, and the northern end of Westminster bridge. He recommends the City Commissioners to make a trial on Holborn Viaduct, the subways being available for the housing of the apparatus. In large workshops it might be even employed with economy, but it is not likely to supersede gas for limited consumption. He anticipates that the public will gain chiefly from the reduction in the price of gas which will result from the competition.

The City Commissioners of Sewers considered on Tuesday a report from the streets committee, embodying that of the City Engineer, summarised above, and recommending that an experiment be tried on Holborn Viaduct. It having been reported that several firms and companies having property adjacent to the Viaduct had expressed a willingness to assist in the experiment at a nominal cost, the report was adopted, with the addendum that the space in front of the Royal Exchange be also illuminated. Mr. Haywood stated that it was intended to keep the trial lights burning throughout the winter months.

The markets committee of the City Court of Common Council are arranging for a display of the electric light to be made about the middle of November, in Billingsgate market, and from a report in another column it will be seen that the Metropolitan Board of Works intended to experimentalise with it upon the Victoria Embankment, and probably also on Waterloo-bridge.

PANIC-PROOF BUILDINGS.

THE recent fatal panic at the Colosseum Theatre, Liverpool, recalls the attention of the profession to a long-standing grievance. This time, however, it is not fire but panic. In spite of warnings the managers of our public places of amusement continue to build according to usage, and architects to supply plans of the ordinary arrangements, and probably the only effectual means of providing theatres and public halls with ample means of egress will be to insist on their supervision by local authorities. In the Colosseum at Liverpool there were, it appears, no fewer than six exits; but as is usually the case, they were nearly all fastened, or useless as means of egress. The doors opened inwards instead of outwards, and the rush of people to them prevented, by their pressure, the doors being opened at all. It appears that Mr. Deacon, the borough engineer, made a report upon this theatre in 1877, and suggested certain improvements. Whether these have been carried out or not remains to be seen. The building has two entrances on one side (Whitechapel), a door in School-lane on the other side, and one in the rear. One of these, the door in School-lane, the borough engineer suggested should be made to open outwards, while the outer door of the pit entrance was recommended to be opened and locked to the wall during the performance; and, in short, that all the doorways of the three occasional exits from the pit should be ready for immediate use as exits when the second performance commences. Now it strikes us very forcibly that many of our London theatres have exit doors which are simply make-believes, which are invariably closed, and often bolted during the performances—that, in short, they are never used as exits at all on ordinary occasions, and when they are required they are not available. We simply mention the Liverpool catastrophe to draw attention to these weak points in our public buildings. Theatres are not the only structures in fault. Are not many of our crowded churches and concert-rooms equally wanting in adequacy of egress? How many of our London churches and chapels, crowded to overflowing on Sunday evenings, have more than one available exit, even when two others are provided, which are generally bolted, and in how many of them are the doors made to open outwards? We only need to make a few observations to be convinced of these facts. Another defect is equally evident if we examine our churches and chapels which are provided with galleries, and that is the very narrow and, in some cases, precipitous staircases, often without a double hand-rail in some of them. These staircases generally converge to one lobby and point of exit, where, under the most ordinary of circumstances, a crush takes place. Many who have attended some of our town churches must have found a difficulty in getting out when the galleries were emptying, and the evil is intensified when the occupants of the side aisles coming out in a stream meet those descending the staircases. A collision is unavoidable under the most ordinary circumstances, but it becomes a fatal crush when a

panic takes place. Now the remedy for this is to provide each gallery with its own entrance, so as to prevent the streams meeting below. Nothing can be simpler nor more architectural than to pronounce the gallery entrances and lobbies; but for the sake of economy it is seldom done. Two handrails to each stairs ought to be imperative, and the flights should be broken in length at spacious landings. Passages and gangways, such as we find in most theatres, should lead to a separate exit or lobby. In no case should one passage lead into another at right-angles, but the direction of the outgoing current should be taken. This is a frequently-infringed rule. In most fatal panics we have noticed that there has been some meeting point or rendezvous of the out-going streams—some fatal *cul-de-sac* or point of collision. It would be impossible for any mishap to happen if the different sections of a building had their own and independent exits.

The next point is space. It is found that in a crowd each person occupies from 1½ to 2 square feet, and 21ft. for every 10 of the audience is the very least available area. We should much question if some of our London theatres had half so much in the passages and lobbies as this allowance; but we find Capt. Shaw says for every 100 persons 250 square feet is not too much. Now the difficulty of clearing our large theatres, or rather the time it occupies to clear them, is considerable, and it is to this practical test after all that we desire to call attention. Every public building should have its exits so *ample* and so *contrived* that it may be emptied within a given time to be regulated by the number admitted. A building of one or more entrances should not be allowed to hold more than a certain number of people, to be determined by the time it takes to clear, for the question that is now the chief one, in our opinion, is no longer the danger of fire, but the possibility of clearing a public building whose occupants are panic-stricken, and in how short a time it can be done. With the Liverpool and other similar fatalities in our memories, it is evident that our architects have not so much to study the fireproof qualities of their buildings as a ready means of escape from them in case of sudden emergency.

A GRAND PIANOFORTE.

OF all kinds of furniture that of the pianoforte adapts itself with difficulty to new forms. Conventional usage still claims for its own the pianoforte of the two types we are accustomed to see, though the "grand" is destined to retain its usual harp-shape even more closely than the upright or cottage form of that instrument, by virtue of the requirements of its construction. There is less opportunity for variety, and therefore the manufacturer is compelled to seek for artistic effect on the inherent richness of the material and its modes of decorative finish. We have had an opportunity of seeing a remarkably rich and highly-finished instrument of the latter kind in the showroom of Messrs. Wright and Mansfield, the well-known manufacturers of art furniture, of 104, New Bond-street, made for a gentleman at Bickley, in Kent. The case is entirely manufactured of rich satin wood, enriched by inlay in the style of Louis XVI. It reminds us of some of the choice works of Riesener, though there is a touch about it also of Chippendale. The top is perfectly plain, of highly-polished satin wood of the most beautiful colour and feathery grain. Round the top is a margin of darker tulip wood, the edges being moulded and gilt. The principal side of the instrument is decorated with inlaid panels or medallions, oval-shaped, with emblematic figures, the groundwork of panels being mahogany with tulip-wood borders, and the figures of light wood. Round these are delicately-designed scrolls and wreaths of different-coloured marquetry. On the straight side a series of inlaid panels occur, with appropriate devices. The legs of the instrument are square and tapering, enriched with simple forms of inlay, and there is generally a quiet yet rich effect and an absence of effort and barbarisms of style. The two shades of wood produce a pleasing harmony, and we may add that the workmanship is of the highest class. We understand Messrs. Broadwood supplied the works, the case bearing the name of Messrs. Wright and Mansfield. The instrument is of fine tone, and we believe its value is estimated at about a thousand pounds. Passing through the show-rooms we noticed some well-designed sideboards, and other furniture in the light and elegant style of decoration of Louis Seize, Chippendale, and the Brothers Adam; and the manufacturers have, we understand, exhibited at the Paris Exhibition some specimens in these fashionable styles of delicate workmanship that equal in point of finish many of the best works of those esteemed periods.

A drawing of another satin-wood pianoforte—we believe by the same artist's design, manufactured for H. Ogden and Son, of Manchester, and exhibited at Paris—is before us, and in general character resembles the one just described, though more pretentious. The chief difference consists in the sunk panels in the sides, and a more formal treatment, in which carving and gilding are more largely introduced. Thus the moulded edge and the outer rails and stiles of the panels are in mahogany, relieved by white lines. Under the top a series of flutings are introduced, and between the two front legs of the side there is a fluted cave, the flutes being mahogany, and the intervening spaces grey. The legs are carved and gilt at the top, and inlays of blue mahogany, holly, and green woods enrich the sides of them. The design, however, depends more on its carved and gilded ornament than its simple inlaid surfaces for effect.

THE DESIGN AND CONSTRUCTION OF SANITARY WORKS.

MR. R. RAWLINSON, C.B., in a paper on "Sanitary Science," mentions the mistakes that have been made upon the best forms of sewers. Thus it is a significant fact, indicating the great revolution made in sanitary construction, that so late as 1850 three eminent engineers, in reporting to the Corporation of London on the best forms and dimensions of sewers, actually recommended the flat-bottomed section as the easiest to cleanse by hand labour, and that no main sewer was to be constructed of less size than would allow a man to enter. House drains were not to be less than 12in. in diameter, and such a thing as a 4in. drain was thought intolerable. A few years have made a complete revolution in opinion. What engineer or sanitary authority would tolerate these dicta now? As Mr. Rawlinson observes, the report was accepted by European engineers generally, and Paris and Brussels contain to this day sewers of tunnel-like capacity. We know sewers exist under some of the London streets large enough for a cart to pass through, with flat bottoms, and almost level gradients, yet these were sanctioned by our engineers twenty years ago. Mr. Rawlinson very judiciously recommends the removal of subsoil water so as to dry the basements of houses, besides town sewering and house draining, and the daily removal of scavenged refuse. Speaking of main sewers, a gradient that will transmit sewage regularly at a rate of not less than one mile per hour, is advocated. They should be well ventilated, and have ample flushing power. Side junctions for house drains should be provided in the first construction, and what is of even greater importance, no drain should traverse a basement from back to front. If it must do so cast-iron pipes are the safest to use as being less liable to breakage, and these should be laid air and water-tight. One correspondent the other day asked our advice upon the prevailing custom of draining several houses through the basements of one house, and few probably who tenant the houses in London ever dream that beneath their parlour or kitchen runs the sewage of eight or ten houses. The back drainage system is recommended by Mr. Rawlinson as the true mode of sewering streets of houses. But that gentleman has not suggested a remedy for the existing and barbarous mode of underhouse draining. It can be done simply and effectually by introducing into the drain pipe at front and back of the house a ventilating pipe or an open ventilating trap, thus clearing out the gas that exists in the length of drain which runs underneath the house.

Little is said about water supply, but that it should be high pressure and constant, each house being supplied at the rate of fifteen gallons per head. London is certainly better off than Paris in the purity and softness of the water, though as far as the Thames below the City goes, Mr. Rawlinson asserts that the volume and weight of silt and sludge poured into the Thames must amount to 200,000 tons or more.

ART AND THE CLERGY.

WRITING in the *Ecclesiastical Art Review*, in anticipation of the Exhibition of Ecclesiastical Art recently held in connection with the Church Congress at Sheffield, Mr. J. P. Seddon declares that as yet there is no real demand for first-class work or art reaching a high ideal. The clergy have it in their power to raise the standard of ecclesiastical art, but to do this "they must know what is best. They must learn, too, not to expect to buy it in shops, not to purchase it by the pound or the foot. They must seek art of artists, and not of tradesmen. Good work is not to be got out of bad hands, any more than figs can be gathered of thistles. Sculpture cheap from the stonemason's yard—as almost all that disfigures the reredoses in our cathedrals and great churches of late years—is only worth what was given for it, and that is next to nothing. The large sums that vergers love to descant upon as lavished on such objects were not spent on art, but on twisted columns, and agate balls, and other trumpery. Artists, not having been consulted, are blameless of the result. Then the use of art to the clergy has also to be considered. Have they really any proper use for it? Can it help them in their work? If not let it pass away. It has furthered pagan ends and superstitious ends in past days; it has furthered social and professional ends in these days. It has been abused, as have most, perhaps all, things good in themselves in this world. But if it can do no more, its day is gone. Let it go."

AWARDS TO ARTISTS AND ARCHITECTS AT THE PARIS EXHIBITION.

WE have received from the English Commission a "first proof" of the list of awards made to British exhibitors at the Paris Exhibition. We have already given the names of most interest to our readers, and have only space here to extract that portion of the list having reference to works of art:—

First Group.—Works of Art.—First Section, Classes 1 and 2 united.—Jurors: E. Armitage, R.A.; F. Leighton, R.A.; and W. C. T. Dobson, R.A.—Oil paintings, different pictures, and drawings.—L. Alma Tadema, A.R.A., gold medal; P. H. Calderon, R.A., Rappel of gold medal; Sir John Gilbert, R.A., bronze medal; the late Sir Francis Grant, P.R.A., Rappel of gold medal; C. Green, honourable mention; Hubert Herkomer, medal of honour; the late Sir Edwin Landseer, R.A., diploma to the memory of deceased artists; G. D. Leslie, R.A., honourable mention; the late G. H. Mason, A.R.A., diploma to the memory of deceased artists; J. E. Millais, R.A., medal of honour; W. Q. Orchardson, R.A., bronze medal; W. W. Ouless, A.R.A., silver medal; J. Pettie, R.A., honourable mention; the late J. Phillip, R.A., diploma to the memory of deceased artists; Briton Rivière, A.R.A., bronze medal; the late F. Walker, A.R.A., diploma to the memory of deceased artists; G. F. Watts, R.A., gold medal.

Second Section, Class 3.—Juror: W. C. Marshall, R.A.—Sculpture and Engravings on Medals.—J. E. Boehm, A.R.A., F. Leighton, R.A., silver medal; F. Leighton, R.A., gold medal.

Third Section, Class 4.—Juror: Chas. Barry, F.S.A., P.R.I.B.A.—Drawing and Architectural Models.—E. M. Barry, R.A., medal of honour; T. G. Jackson, honourable mention; Horace Jones, bronze medal; J. L. Pearson, A.R.A., gold medal; J. P. Seddon, bronze medal; Norman Shaw, A.R.A., silver medal; G. E. Street, R.A., gold medal; A. Waterhouse, Rappel of medal of honour; T. H. Wyatt, silver medal.

Fittleton parish church, Wiltshire, was reopene on Wednesday week, after restoration from th designs of Mr. William White, F.S.A., of London The church has been underpinned and well drained throughout. The chancel arch and the bases of the columns have been removed, the Norman font has been better placed and repaired, and the high pews have been removed and new open seats on wood-block floors have taken their place, as well as new reading-desk and lectern. The builder was Mr. T. Gregory, of Clapham Junction.

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ILLUSTRATIONS.

OLD HOUSES IN WARWICKSHIRE—DETAILS OF NEW NATURAL HISTORY MUSEUM—NEW CHATEAU, ST. LOUIS, QUEBEC.

OUR LITHOGRAPHIC ILLUSTRATIONS.

OLD HOUSES IN WARWICKSHIRE.

For a description of the subjects of this illustration—the Priory at Warwick and the summer-house re-erected in a garden at Lower Ettington—see article on p. 417.

NEW NATURAL HISTORY MUSEUM, SOUTH KENSINGTON.

The week before last we commenced our series of working detailed drawings illustrative of this important building. To-day we devote three lithographic pages in continuation of the subject, and these illustrate the half of the north end interior elevation of the Index Museum down to the gallery level, including the archways at the end of the galleries. This is one of the most elaborate portions of the building, with the staircase below, of which we hope to give drawings, as well as a general plan and elevation of the entire structure. Our single-page sheet furnishes details of the first-floor windows on the main façade on south front. Ample references are given on the drawings, so that they will explain themselves, while the terra-cotta ornamentation is shown to an enlarged scale from sketches taken from the actual work. Our next illustrations from this building will include details of the exceedingly rich principal entrance, with its frieze and figure panels. Mr. Alfred Waterhouse, A.R.A., is the architect.

NEW CHATEAU ST. LOUIS, QUEBEC.

A few years since the Governor-General of Canada, Lord Dufferin, suggested some desirable improvements in the old city of Quebec—amongst others to impart an appropriate architectural character to the openings required for the extension of streets through the city walls; and, by the erection of suitable gates or bridge connections at these points, to complete the promenade which the walls are so well calculated to form, for the enjoyment of the inhabitants, and of the many visitors from the United States and elsewhere, who are attracted to Quebec by the unique character of the city. The promenade was to be continued round the outside of the citadel, towards the Plains of Abraham, from which side a fine view of the river St. Lawrence is obtained. It was also suggested that a residence, to be used by the Governor-General during a portion of the year, should be erected within the citadel. The Queen has presented a sum to the city of Quebec, through Lord Dufferin, for the erection of one of the city gates, to be called the Kent Gate; and it is intended to associate the names of the Earl and Countess of Dufferin with another of these structures. From recent reports it would appear that a commencement is about being made towards the carrying out of the works. The proposed improvements were illustrated in the *American Architect and Building News* (April, 1877). We now give an enlarged drawing of the residence, or New Château St. Louis, as it was proposed to style it, after the former residence of the French Viceroys. The designs are by Mr. W. H. Lynn, R.H.A., of Belfast, who had the honour of being commissioned by Lord Dufferin to visit Quebec for the purpose of advising on the projected improvements.

REFERENCE TO PLAN.

1. Drawing-room, 25ft. × 32ft.
2. Ante-room, 31ft. × 24ft.
3. Dining-room, 37ft. × 24ft.
4. Hall, 45ft. × 25ft.
5. Library, 22ft. × 18ft.
6. Porch.
7. Business-room, 18ft. × 18ft.
8. Waiting-room, 12ft. × 12ft.
9. Back stairs.
10. Principal stairs.
11. Corridors.
12. Butler.
13. Billiard-room, 27ft. × 20ft.
14. Ante.
15. Armoury, 42ft. × 32ft.
16. Yard.
Officers' quarters beyond armoury.

COMPETITIONS.

Gloucestershire New Pauper Lunatic Asylum. — At the Gloucestershire Quarter Sessions on Tuesday week the purchase of the Barnwood Mill estate, comprising 118 acres, was reported as having been completed. It was resolved to offer prizes of £150 and £70 for designs for a new pauper lunatic asylum, to be erected on the site, the set gaining the highest prize to become the property of the county. Accommodation to be provided in blocks for 700 patients, but the designs to show provision in the first instance for 100 patients, and proportional departmental accommodation. A committee was nominated to draw up instructions and consider designs.

Lambeth Pauper Schools at Lower Norwood.—In reply to the advertisement of the Guardians of the Poor for Lambeth, six designs have been received for additions to schools at Lower Norwood, but no decision has been arrived at. A meeting of the board was held last Wednesday week, when it was decided that professional assistance should be obtained, and we now understand that the designs have been referred to Mr. Currey, F.R.I.B.A., to report upon and select the best three. It appears that this decision was not unanimous; that Mr. Akerman Mills, one of the members, deprecated this course, and thought there were practical members on the board who were better qualified to judge of what they wanted "than an architect who might follow the rule of his profession, and go in for effect more than practical utility." We cannot understand the policy of the board in not exhibiting the drawings, as such a course would have enabled the guardians to have come to a more unanimous opinion upon their merits than they seem to have done, while public criticism in the professional press could not have hampered the referee's decision, but rather facilitated it. The conditions issued to architects proposed alterations and additions to the present schools at Norwood for the accommodation of 700 children, and officers and servants, also an infirmary for 100 children, with means for the classification of patients, and separation of infectious cases, upon a site at the south-west corner of the land. The chief provision competitors had to make was for a complete school and industrial establishment, covered playgrounds, and probation wards for 30 children, and the separation of the infirmary. The conditions require certain allowance of cubic space—namely, 850 cubic feet for the sick, and 71ft. of floor area, and for the healthy 300 cubic feet of space, and 25ft. of floor area. These quantities of space are required in both the day-rooms and dormitories. It was further stipulated that the boys' and girls' schoolrooms and the dormitories over were to be preserved, though each competitor has been at liberty to preserve or remove any of the other buildings. Ample light and air and future extension are two points which should have some weight in the decision, and we are glad to see that simplicity and economy of arrangement is insisted upon. The designs received bear the following mottoes: 1, "Simplicity, Utility, and Economy"; 2, "Light and Air"; 3, "Terra Cotta"; 4, "Thought and Industry"; 5, "Ratepayer"; and 6, "Simplicity." Though the three premiums of £150, £100, and £50 are sufficient, we can hardly be surprised at the fewness of the designs submitted in the face of the surprising condition that the successful competitor shall carry out such work as the guardians may determine for a commission of 3½ per cent., less the amount of premium, the said commission to include all travelling expenses and attendance. No perspective or pictorial drawings have been admitted. We have reason to know that three or four competitors are Fellows of the Institute, and we cannot understand how such a condition could have been accepted by them.

Southey Board Schools.—The Forest of Dean School Board considered at their last meeting the half-dozen plans which had been selected from the nineteen originally received in competition for the new schools at Southey. Those of Mr. Moore, of Gloucester, were adopted, provided a builder be found to carry them out within 10 per cent. above the estimates. Those by Messrs. Haddon Brothers, of Hereford and Malvern, were placed second.

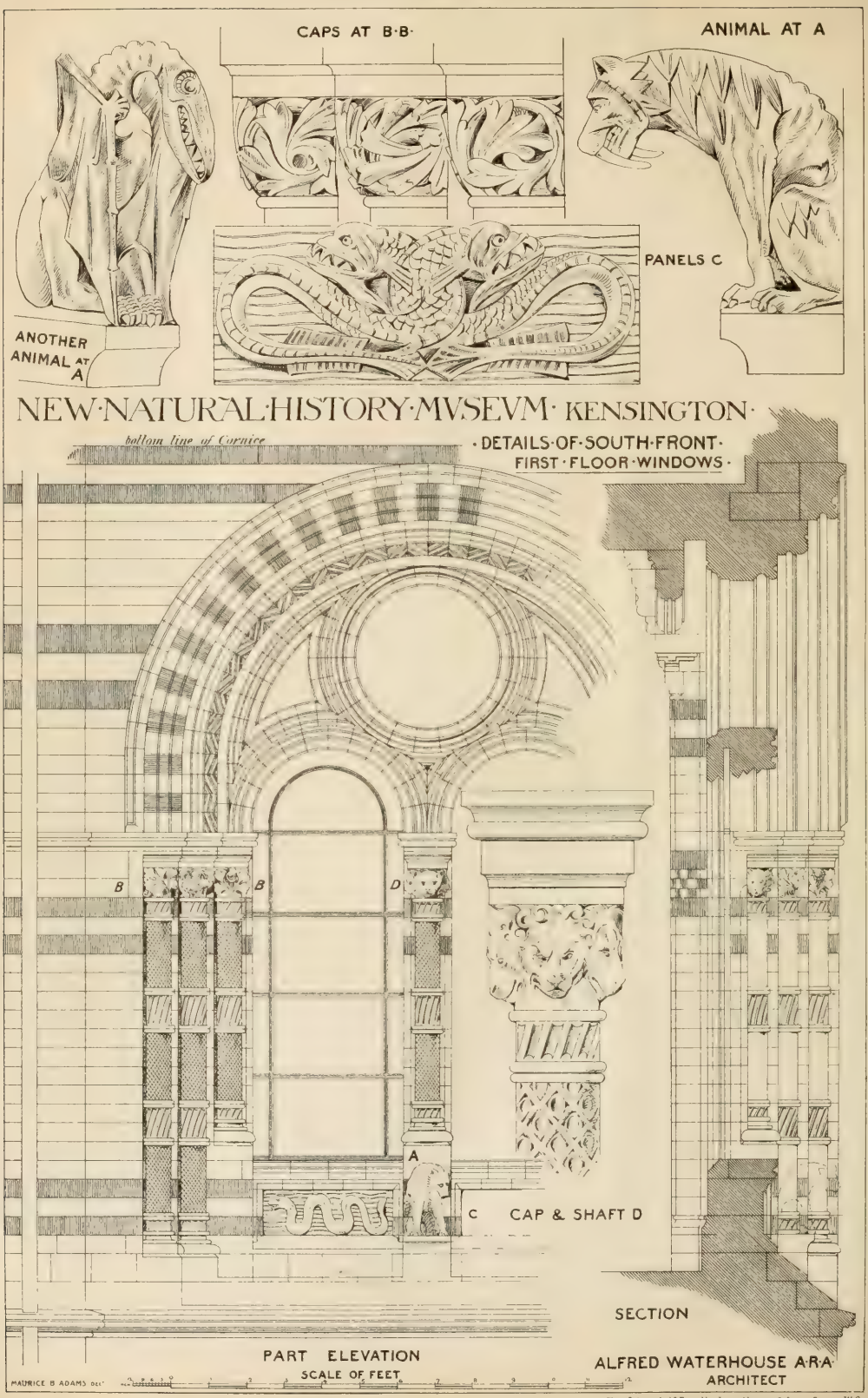
Tulse-hill.—A new Wesleyan chapel is about to be erected at Tulse-hill, and for this purpose, some months since, the committee in connection with the project invited some few architects to compete, and the following gentlemen were among those who consented to submit designs:—Messrs. Power and Wheeler; E. C. Robins, F.S.A.; Robert Walker; C. O. Ellison, of Liverpool; and Charles Bell. During the eight months since the designs were sent in, several stories as to the likely award gained currency among those interested, and now we learn that Mr. Charles Bell has been elected architect for the new building. We understand that the original design was supplemented by another, for which a tender from a builder was obtained before the election was determined upon. We do not know if this advantage was obtained by all the competitors or not. If granted to one competitor only, surely an injustice has been done.

THE BUILDING TRADES DIRECTORY.*

The third edition of the "Building Trades Directory," just published by Messrs. Kelly and Co., is to hand, and bears evidence, equally with its predecessors, to the care exercised in its compilation and the growth of the industries to which it is the indispensable guide. In London alone there are nearly a hundred thousand persons immediately engaged in the building trades, besides thousands more engaged in avocations indirectly connected with them. Since the publication of the last "Building Trades Directory" the state of trade generally amongst this large community has been exceptionally good, in spite of surrounding depression both at home and abroad. That it may continue so must be earnestly desired when the vast amount of capital and labour employed in building industries throughout the kingdom is borne in mind. In the preface to their directory Messrs. Kelly and Co. remind us that there are in England 5,672 architects, 3,097 surveyors, and 23,129 builders, who find employment for no less than 576,426 skilled workmen, in addition to 516,605 general labourers. Besides these there are more than 3,000 sculptors and carvers, who aid in the work of embellishment, and an unnumbered army of metal workers, decorators, and designers, without whose aid much of the work done would be incomplete. Whether we consider the numbers employed, the amount of capital invested, or the importance to the public generally of the work done by the building trades, it is evident that they form a group far in advance of any other body of kindred industries. That they may still continue to increase in wealth and numbers, and that every successive edition of the "Building Trades Directory" may correspondingly grow in bulk and circulation, is a wish that cannot but be echoed by all our readers.

A scheme of drainage is about to be carried out by the Bognor Local Board. Mr. Arthur Smith, C.E., is the engineer, and he will be assisted in the superintendence of the work by Mr. Stringfellow the recently-appointed surveyor of the town.

* Post-office Building Trades Directory. London: Kelly and Co.



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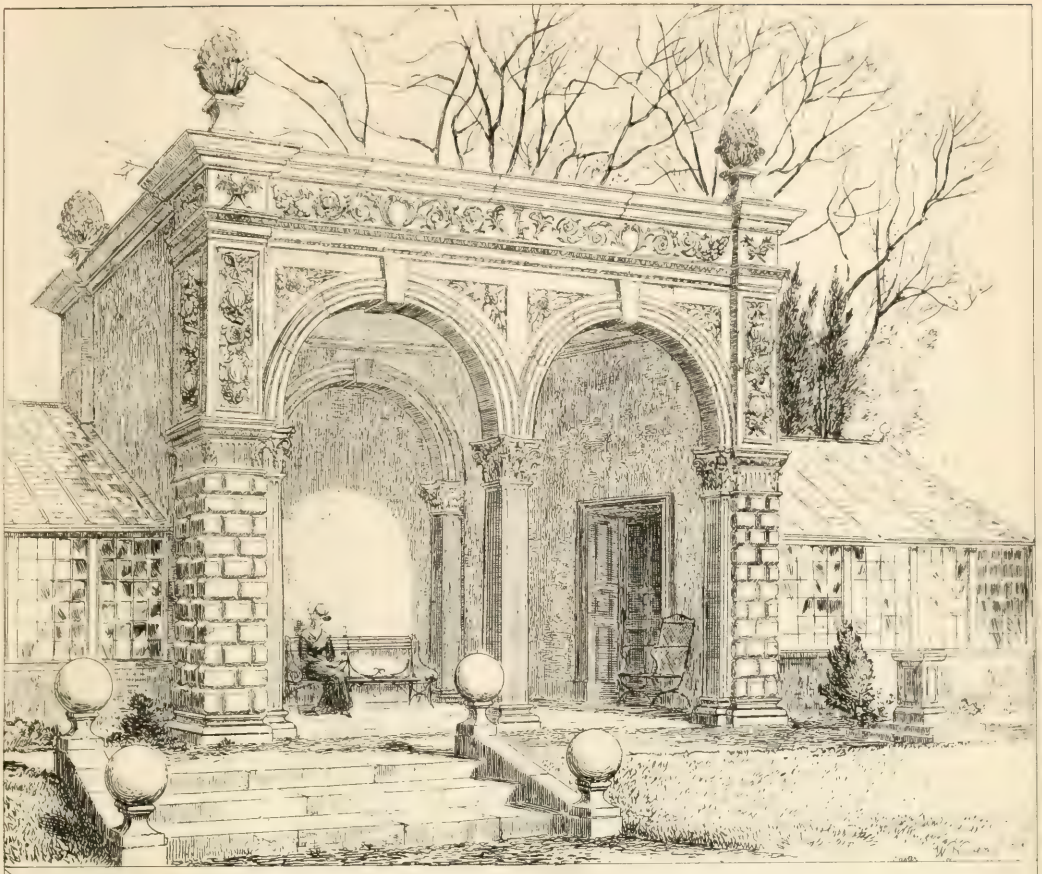

OLD HOUSES IN WARWICKSIHRE.

OUR COMMONPLACE COLUMN.

DIMINUTION OF COLUMN.

VARIOUS authors have treated of the diminution of a column. It is generally considered that the taper or diminution should commence from a quarter to one-third of the column's height. Vignola's method consists of first fixing upon the height of the shaft and its upper and lower diameters. Next draw a horizontal line from bottom of shaft perpendicular to axis. From the extreme outer point of the upper diameter set off upon the axis the semi-diameter of the bottom of shaft, and draw through last point so found an oblique line, cutting the horizontal base line in a point. From this point draw any number of rays or oblique lines through the axis, and set off from it on each line the semi-diameter at base. Through the points so determined draw the curve; the other side of shaft can then be drawn symmetrically. This curve is a conchoid. Blondel applied the instrument of Nicomedes for describing the curve, which consists of three rulers, one forming the height of shaft, another horizontal at the base and fixed at right angles. A dovetail groove is formed in the upright rule for the sliding of a pin in a third ruler, which may be described as forming the hypothenuse. At lower end of the latter another groove or slot is made, into which a pin fixed at the end of the horizontal rule works. It will now be be seen that this oblique rule can be made to describe an arc of the curve, and that the apparatus becomes, in fact, a mechanical method of describing the curved swelling without the trouble of drawing the rays first mentioned, and that this plan of Blondel was an improvement on Vignola's method, which required the curve to be drawn by the hand. Perrault observes justly, upon Vitruvius's dictum, that the height of a column should regulate the degree of diminution; for, says Perrault, a lofty column ought to be viewed from a farther distance than a shorter one in the proportion of the height of each, and hence the principle of similar triangles comes into force, for it will be seen that as the real size or height of a column differs, the apparent one differs in like proportion. Chambers observes also a pleasing degree of diminution is applicable to columns of different heights, provided the point of view is not limited. We refer the reader to their works, and also the "Encyclopædia of Architecture," by Gwilt. We think, however, that lofty columns with a limited point of view should diminish more than short ones. Vitruvius recommends a diminution of one-sixth of the lower diameter; most ancient examples show one-eighth. See articles "column" and "Entasis."

DOMUS CONVERSORUM.

The domus conversorum was the day-room of the conversi of a Cistercian monastery, who performed the labour of artificers, cultivators of the land, &c. We refer the reader to Mr. Sharpe's work on "Cistercian Architecture" for a thorough inquiry into its position in relation to the conventual buildings.

DOME,

From Lat. *domus*; It. *duomo*. For an investigation of the theory of the dome we refer our readers to "Ware on Vaults," Rankine's "Applied Mechanics," "Gwilt's Encyc.," article on "Dome" in the "Encyc. Britannica," Tarn's "Science of Building." We may simply say here that the principles of the arch and dome are distinct. The stability of the former depends on different laws. No part of a dome can fall inwards, like an arch, and it is a complete structure without its upper segment. There is less pressure upon the haunches and abutments of a dome than in an arch of the same radius. Upon this question we refer the reader to Mr. Papworth's remarks in the "Transactions of the Institute of British Architects," Sir Edmund Beckett's "Theory of Domes" in his "Book on Building."

"J. A." sends the following notes on domes:—The most magnificent dome of antiquity is that of the Pantheon. It is constructed of bricks and rubble; thickness at base, 17ft.; 5ft. 1½in. at the top of the highest step; 4ft. 7in. at the top of dome; the circular wall which supports the dome 20ft. thick. The external part appears to have been decorated with bands of bronze. Near Pozzuoli there is a very perfect circular building, with a dome 96ft. in diameter, built of volcanic tufa and pumice-stone. The following are the admeasurements of some of the principal domes in Europe:—

	Feet in diameter externally.	Height from ground line.
Pantheon	142	143
Minerva Medica	78	97
Baths of Caracalla ...	112	116
Baths of Diocletian ...	74	83
Temple of Mercury ...	68	—
Temple of Diana	98	78
Temple of Apollo ...	120	—
Temple of Proserpine and Venus	87	77
Santa Sophia, at Constantinople	115	201
Mosque of Achmet, Constantinople	92	120
San Vitale, Ravenna	55	91
San Marco, Venice ...	44	—
Santa Maria del Fiore ...	139	310
Chapel of Medici	91	199
Baptistery at Florence ...	86	110
St. Peter's at Rome ...	139	330
Church of the Madonna, Venice	70	133
Church of the Superga, Turin	64	128
Church of the Invalides, Paris	80	173
Church of the Val de Grace, Paris	55	133
Church of the Sorbonne, Paris	40	110
Pantheon, Paris	67	190
St. Paul's, London ...	112	215
Reading-room of British Museum	140	106

The dome of the Pantheon at Paris is constructed entirely of stone. The dome of St. Paul's is too well known to need any description; that of St. Peter's, at Rome, stands on four piers, 62ft. high; from the arches spring corbellings, which are finished by an entablature, upon this is a plinth, octagonal within and circular without; upon this is a circular stylobate, 12ft. high. Above the stylobate is the drum of the dome, built of rubble and fragments of brick, and pierced by 16 lofty windows; the height of drum is about 52ft. On this is placed a circular attic story, 19ft. high, and then comes the double dome; space between the two domes varies from 3ft. to 10ft. in width; thickness of the inner dome about 6ft., the outer dome is of less thickness; the two are joined together by 16 strong walls or spurs. Above the dome are a lofty lantern and cross; the dome is about 102ft. high above the drum, and the lantern and cross 90ft. above the dome.

DORIC ORDER.

The Doric order is exclusively a Greek order, and it is the oldest, simplest, and most intractable of all the orders. Its origin has been traced to the proto-Doric example at Beni-Hassan. The temple at Corinth, the Parthenon, and the temple at Delos illustrate three types of proportion—the first being 4·47, the second 6·025, and the third 7·015 diameters in height. "C. F. W." says: In its simplicity and massiveness of construction it corresponds to the epic verse of Homer and Hesiod; to the *genre* style of painting, and the archaic of sculpture, and to the infancy of man. It derives its name from the Dorians—a small but warlike tribe from the north of Greece, who marched southwards, and occupied Laconia—a district in the S.E. of Peloponnesus. They are mythically descended from Dorus—one of the sons of Helen, King of Phthia. The order is too well known to need description. The following list of Doric temples may prove useful to the student:—The Parthenon, at Athens; Theseum, Pæstum, near Salerno; Ceres, at Eleusis; Nemesis, at Rhamnus; Jupiter, at Olympia; Athene, at Ægina; Apollo, at Bassæ; Jupiter, at Nemea; three temples at Agrigentum, two at Pæstum, Segeste; Minerva, at Syracuse; Apollo, at Delos; a temple at Corinth; Propylæum, at Athens; portico of Augustus at Athens; Roman Doric theatre of Marcellus at Rome; temple of Hercules at Cora.

DOVE.

In Christian art the dove has been employed as an emblem of the Holy Ghost, probably from the idea of the form of descent of the Holy Spirit at our Lord's baptism. It is shown white to symbolise purity, with its beak and claws red. Various forms of this symbol have been adopted by artists. In some a nimbus surrounds the head with a cross red or black, sometimes we see seven rays introduced, emblematic of the seven gifts of the Holy Spirit, sometimes an olive branch is shown in the beak to represent peace. A dove with six wings is a type of the church—the breast is of silver and the back of gold. Sometimes the pyx is made in the form of a dove, and suspended over the altar. We also see it on font covers.

DOVECOT.

A dovecot should be elevated as in the gable of a roof; a loft is sometimes used. A turret may be introduced with good effect on one of the outbuildings of a residence or an appendage made. Nests of open boxes, about a foot square, all placed against the wall, with a projecting lower side of 3 or 4 inches.

DRY ROT.

We refer the reader to articles in the BUILDING NEWS (Vol. for 1875), to T. A. Britton's "Treatise on Dry Rot in Timber" (Spon), where remedies will be found. The best course is to prevent the mischief by recourse to a current of air round the ends and below all bearing timbers, together with good drainage and the avoidance of moisture, either caused by leakage or condensation. Impervious coverings—such as oil-cloth, kamptulicon, &c.—induce the disease by preventing free evaporation. Ill-seasoned wood, if used with no ventilation, is chiefly subject to dry rot. Charring the timber and a coating of coal-tar are preventive means. Solutions of corrosive sublimate used hot, and sulphate of copper, also paraffin oil, have been used with advantage in checking the disease.

W. Stevenson writes:—Dry rot is a term applied to the decay of wood, and some writers have attempted to classify it, giving a variety of it the term "wet rot." It is a mode of decay brought about by the presence of heat and moisture in a confined or stagnant atmosphere. It will occur in the heart of a living tree, in the hold of a ship stored with new-sawn wood, in newly-felled wood when the bark is not removed—as in the case of the silver birch; but it is most common in timber or wood placed in work in new or old buildings in situations where ventilation is disregarded or difficult to attain. As timber contains albuminous matter it is liable to fermentation, which engenders a low form of fungi that eats up and destroys the tissue of the wood. Dry rot as an agent of destruction in wood is only active during the summer season, except in an artificial manner, which is brought about by the introduction of heated water or steam pipes, in which case it will remain active all the year round. Wainscoting of walls, floors on the ground level, and woodwork bedded in porous stone walls, or covered with lead, as in the case of church roofs, are most liable to its action. In the wainscoting and flooring the moisture is supplied from the walls or the ground itself, and if the outer face of the wood is coated with paint, or covered with oil-cloth or kamptulicon, the disease is aggravated. In the case of church roofs the moisture is supplied by condensation of the atmosphere, and as its cannot pass off through the impervious covering of lead it is absorbed by the wood, and dry rot ensues. Beech, birch, ash, walnut, sycamore, and other sweet woods are subject to dry rot and to the attack of worms in the form of the larvæ of certain beetles; whereas the wood of the oak, and some varieties of the pine and fir, that secrete bitter and unpalatable matter in the heart-wood, are less liable.

EARLY ENGLISH OR LANCET.

This style succeeded the Norman towards the end of the 12th century, and lasted during the following century. According to Rickman it continued during the reigns of Richard I., John, Henry III., and Edward I., or from 1189 to 1307. Mr. Sharpe assigns it the period from 1190 to 1245. The characteristics of the style

are those of lightness and elegance; the windows are long and narrow, lancet-shaped, often in groups of threes or more under one arch. The spaces between the heads are often pierced, and this was the origin of tracery. Mouldings consist of alternate rounds and deeply-cut hollows, with fillets, and produce depth of shadows and strong lights. The tooth ornament is the most characteristic ornament; the foliage is deeply cut and stiff in its forms. Segmental and trifoliated doorways occur, buttresses are deep, and the stages are often marked by weatherings, both on the front and side, and their summits often rise above the parapet, and are gabled. (See buttresses of Salisbury Cathedral). This style corresponds to the *Ogivale Primitive* of the French. The term First Pointed is perhaps the most discriminative.

"W. W." writes:—"The features of this style which principally distinguish it from all others are the lancet, equilateral, obtuse, or segmental arches, the mouldings, pinnacles, sculptured ornaments, and figures, and the buttresses which in the following styles were sometimes placed diagonally. In earlier examples the clustered shafts were very plain, consisting merely of round and hollow members. Mouldings of like form encircled the tops of the clustered pillars with similar or octagonal bases. In later work the capitals were covered with the conventional foliage belonging to the period in which trefoiled leaves generally predominated, the stalks of which branched out as it were from the neck or abacus of the pillar, and the foliage curved and winded itself round the upper part or bell of the capital. Among the examples of this date are Salisbury Cathedral; Lichfield; the nave and Lady's chapel, Oxford; the chapter-house, Peterborough; the west front, Canterbury; the transepts, York; the transepts, Westminster Abbey, &c."

"J. A." sends the following notes upon the peculiarities of this style and examples:—"The windows, lancet-headed and narrow, consisted first of a single opening, then of two openings combined together, and then of three, the centre one rising higher than the other two: an example of this kind may be found in York Minster. Another mode of window was a circular light surmounting two pointed windows, and the whole combined within a larger arch; examples of this are to be seen in Westminster Abbey. Doorways: The receding sides or splays of the doors retained still the Norman depth, and were enriched with columns; the hood moulding or dripstone above the doorway rested in many instances on carved heads. Pier-arches (so called to distinguish them from arches in the walls), lancet-shaped, and placed upon piers with shafts, giving somewhat of a clustering effect. Buttresses, narrow, and projecting more than those of Norman buildings, and divided into stages. One of the finest examples of this style is Salisbury Cathedral (1217—1280). Lincoln and Westminster also present fine examples. Among others the following list of examples may be found useful:—

Window at east end of Temple Church, London, built by the Knights Templars, about 1240.

Window in western gables of Temple Church, London, built by the Knights Templars, about 1240.

Doorway on north side of Stone Church, Kent, supposed to have been built by Walter de Merton, Bishop of Rochester, about 1270.

Arcade in chancel of Stone Church, Kent, supposed to have been built by Walter de Merton, Bishop of Rochester, about 1270.

North window in east wall of nave of Stone Church, Kent, supposed to have been built by Walter de Merton, Bishop of Rochester, about 1270.

Doorway from the church into the East Cloister, Westminster Abbey, built by Henry III., about 1270.

Tomb of Queen Eleanor in Westminster Abbey, built by Edward I., about 1292.

Screen on South side of choir, Canterbury Cathedral, built by Prior Henry d'Estra, about 1304.

Monument of Edmund Crouchback, Earl of Lancaster, Westminster Abbey, built about 1307."

EARTH CLOSET.

Under this head "C. W." sends the following:—Earth closets are valuable where a water sewage system is not in force, or where the water supply is limited—in isolated buildings, &c. They consist usually of a seat and riser, with or without a pan, and a receptacle underneath for receiving the excreta. This receptacle is best, when portable, made of galvanised iron in the form of an elliptical or round tub or bucket, affording no corners for accumulation, with handles for withdrawal through an opening formed in the back or side wall of closet. The size should be such as will necessitate frequent attention, so as to insure the successful working of the system. The tubs may be coated with a lining, having disinfectant or absorbent properties, that deodorises the excreta, or a separate receptacle may be provided to contain the deodoriser, usually fixed at the back of seat of a hopper form, through which a certain quantity is made to cover the deposit. This is affected by a pull-up or lever action, by the shutting of flap, spring-seat, or a treadle action similar to that sometimes used for w.c. or urinals. The deodorants are chiefly earth, charcoal, or ashes, used separately or mixed, so as to increase the absorbent powers of the earth. The earth should be of a clayey nature, thoroughly dry and in a state of fine powder. About 2lb. would be required for each action, the quantity being increased if of a sandy nature. The charcoal should also be finely ground and perfectly dry; its absorbent and deodorising properties being greater than earth, about ½lb. would be sufficient for each use. When ashes are used as the deodoriser the house ashes may be utilised—a contrivance being introduced for screening and depositing the ash, separating the cinders for re-use. The deodorising properties of earth, charcoal, or ashes are greatly impaired when saturated; to keep the quantity of deodorant required within reasonable limits an improved earth closet has been introduced, having a separate receptacle for the liquid portion of excrement, which is treated with earth or coarse charcoal, or carried into the drain for slops, &c. The necessity for such drains still exists. The deodorant is frequently dried and re-used for a number of times, the value as a manure being thereby increased. In comparison with w.c. the advantages claimed are less expense in first cost, not easily put out of order by action of frost or improper use, less repairs required, a large saving of water is effected, and the value of resultant compound as a fertiliser is considerable, admitting of easy and inexpensive removal, requiring no further treatment before being applied to the soil.

EASTER.

A shallow recess or receptacle for the holy elements consecrated on Maunday Thursday till Easter-day. The recess is generally under an arch of ogee label or ornamental form, and situated on the north side of the altar.

EAVES.

Eaves, the margin or lowest part of roof, are best constructed to overhang, so as to afford a protection for walls. The extent of projection will be regulated by the nature and position of building, pitch of roof, &c., ornamental effect being introduced by the finish put upon fascia, soffit, ends of rafters, brackets, &c. The eaves of roofs are frequently stopped inside the face of walls, the walls being coped by a cornice, hollowed out to form a gutter, or surmounted with a blocking course or balustrade, to give stability and admit of the formation of gutters inside. With this construction there is always a danger of leakage through defective joints in lead work or masonry, especially when the walls are thin. The massive cornices with excessive projections that are sometimes introduced in ordinary buildings, without regard to appearance or proportion with reference to height, conveys the impression of top-heaviness and impending danger to passengers below. A better effect is often obtained by a simple eaves course on brackets or corbels supporting the gutter well over face of wall. A dwarf parapet, constructed at eaves with sufficient stability to resist the pressure of snow, &c., prevents the latter from falling on the footpaths. Openings may be introduced at intervals to give a lighter appearance, and admit of overflow from accumulation of snow, &c.—C. W.

ART AT THE SOCIAL SCIENCE CONGRESS.

THE Social Science Congress was opened on Wednesday, at Cheltenham, with an address by Lord Norton, the president, who at the conclusion of his speech made the following remarks:—

"I will say one word only on the new department of our discussions—that of Art. Its introduction has rightly asserted the essential association of beauty with convenience and utility, and the refining influence of its study on the commercial spirit. Surely it is the ignorance resulting from its long-neglected study that has allowed the notion to spring up that beauty is something separate from fitness, something to be added as ornament, and not consisting, as it does, in cultivated adaptation. Has not this error led our architects and manufacturers to borrow incongruous features from other conceptions, or, at best, to seek beauty for their own works abstractedly from their use and purpose? There is essential beauty, no doubt, in form, and essential ugliness, too. It is not for me to conjecture why swans contrast with geese. They certainly express each their own ideas, whatever may be the purpose of forms expressing ugliness. But talking of art as to its application in social science, one is simply considering its usefulness in adding beauty to utility, and that addition must chiefly consist in the expression of fitness and truth. Too many even think for beauty's sake to make things look like something different from what they are; an engine-house like a church, a smoke-shaft like a campanile, a pair of tongs like a Gothic arch, and, in this idea, to conceal features which properly belong to the design, as, instead of making chimneys honestly and gracefully fulfil their part, twisting them into butteries. It is thought a beauty to make china look like gold or bronze, and house decorations as various counterfeits and imitations, such as wall paper as embossed leather. This is jugglery, not art, or certainly not art giving beauty to utility. To make a building commend itself to the eye as admirably suited to its purpose, to depend for beauty on proportion, to dare to leave large breadth of space unornamented in reliance on its fitness speaking for itself, to eschew unmeaning features, sham windows, and superfluous detail, to imitate Nature in truth and in appropriate effect, to embellish forms without a masquerade of colours as a savage tattooing his skin, such are true aims of Art, taking beauty as its ingredient, and not as an adjunct. We go beyond asserting that a general diffusion of a sound artistic spirit would be a social good, to consider in what that soundness must consist. We shall overhaul our street architects for making chimneys that will not draw, and so inartistically as to entail on all our streets the horror of sky-lines of zinc piping, or for the carelessness which gives us crumbling walls, windows looking colossal outside and cut in half for use within, or the adoption of reception-rooms that require temporary verandahs to be added whenever they receive—all losing more and more of beauty as they sacrifice its essence to its false idolatry. Beauty will follow the designs of those who work in its full spirit, who seek neither beauty apart from utility, nor, on the other hand, utility apart from beauty."

The work of the sections commenced yesterday. In the Health Department papers have been or will be read on Disinfection, by Drs. Hardwicke and Bond; Sanitary Condition of Houses, by Dr. Alfred Hill and Mr. F. W. Waller; Overcrowding, by Dr. G. W. Child; Water Supply, by Messrs. J. L. Roberts and J. Lucas; Density of Population, by Dr. Farr, F.R.S.; Diphtheria, by Mr. Alfred Haviland; Hospitals for Infectious Diseases, by Dr. E. T. Wilson; Mortality from Intemperance, by Dr. Norman Kerr; Public Parks and Recreation Grounds, by Miss Matilda Vernon; Mortality of Males, by Mr. T. A. Welton; Poisonous Paints and Papers, by Dr. Bartlett; and Vestry Neglect, by Mr. Henry Robinson, C.E. In the Art Department, Street Architecture, by Mr. H. H. Statham; Music, by Mr. John Hullah; Art in Towns and Villages, by Messrs. Horsfal and Colonel Blair; Art Progress, by E. J. Watherston; A National Theatre, by Mr. George Godwin, F.R.S.; Decorative Art, by Mr. P. G. Skipwith; Dramatic Reform, by Prof.

Armstrong; the Undraped Figure, by Mr. P. H. Rathbone; Rural Museums, by Mr. Tito Ragliardini; Sculpture, by Mr. H. P. M'Carthy; Humanising Influence of Art, by Dr. Phené, F.S.A.

CHIPS.

The Wesleyan chapel at Southwold, Suffolk, is being seated with benches in place of high pews, and a rostrum is being substituted for the pulpit of 1835. The work is being done under the supervision of Mr. R. J. Allen.

The Shoreditch vestry have decided to adopt a design prepared by Mr. Walker for a granite lamp column and drinking fountain, to be erected in the open space in Old street, opposite Pitfield-street, Hoxton. The estimated cost is £500.

St. Joseph's R. C. Church, Christchurch, Hants, will be reopened on Sunday, after improvement and renovation, and the erection of a new organ. The structural works have been carried out by Mr. Pope, from the designs of Mr. Purdu, architect.

The Paddington vestry have resolved to secure a piece of freehold ground north of Shirland-road as a recreation ground, it being offered by the Ecclesiastical Commissioners for that purpose at a reduced sum.

The Northbenden Local Board have appointed Mr. F. Rothera surveyor and inspector of nuisances.

The Town Commissioners of Hove, Sussex, have decided to commence at once the erection of a town hall in Church-road. The outlay will be about £25,000.

The Kensington Vestry, at their meeting on the 16th inst., accepted Mr. Braid's tender for £30,549 for building the new vestry-hall and offices. The Prince of Wales is to be asked to lay the foundation stone.

Mr. R. Harrington has been elected surveyor of Southend-on-Sea.

The Local Government Board have decided that the Rugby Local Board have no power to pass plans for the erection of cottages with only two bedrooms, on moral as well as sanitary grounds.

The Corporation of Cork have selected the designs prepared by Mr. Claxton Fidler, C.E., for the Anglesea iron bridge, subject to some slight alterations suggested by Mr. B. B. Stoney, C.E.

Mr. David Laing, LL.D., keeper of the Signet Library, Edinburgh, died on Friday, aged 88. His death creates another blank in the group of Scottish antiquaries and archæological writers.

At Poole Petty Sessions last week Samuel Clark, builder, of Parkstone, was summoned, at the instance of Mr. H. Miller, the recently-appointed borough surveyor, for commencing the erection of a new Wesleyan chapel in High-street, Poole, without having first submitted plans to the town council, and was fined 1s. and costs. Similar penalties were also inflicted on Messrs. Habgood and Itchings for like offences.

The parish church of Portobello was reopened on Sunday, the 20th inst. It had been closed for over five months while a new wing was being added and the interior entirely remodelled. The church is now seated for 966 persons. It is not expected the cost will exceed £2,500. The work has been carried out from the designs of Mr. James M. Henry, Edinburgh.

The St. Saviour's, Southwark, board of guardians have instructed Mr. Jarvis, their architect, to draw up plans for a dining-hall and improved laundry accommodation at the Christchurch workhouse.

The Honey memorial window at Holsworthy has been unveiled. The window was designed by Mr. W. T. Buxton, of London, and is a three-light Early English Litany window, having three trefoils at the top.

A workhouse infirmary is in course of completion in Rotherhithe for the St. Olave's board of guardians. Mr. H. Saxon Snell is the architect, and Messrs. Perry and Co. are the contractors.

An inquiry has been held at Cambridge, before Major Tulloch, R.E., one of the inspectors of the Local Government Board, on the sanitary condition of the town, and especially as to the state of the river Cam.

The excavations at Irchester camp, and the neighbouring farm premises known as Chester House, near Wellingborough, are being carried on with vigour under the superintendence of the Rev. R. S. Baker and a committee. During the past week many fresh traces of the Roman occupation, in the form of worked masonry, coins, and pottery, have been disinterred.

On Wednesday week the memorial stone of a new Presbyterian church was laid in Anglesea-road, Portsmouth. The church will seat 500 persons, and the work is being carried out by Messrs. W. R. and C. Light, of Landport, from the designs and under the superintendence of Mr. Thomas Arnold, architect, of Basinghall-street, London.

Building Intelligence.

Bedford.—At the Bedfordshire Quarter Sessions last week a report, plans, and designs were received from Mr. Alfred Waterhouse, A.R.A., who had been consulted as to the rebuilding of the Shire Hall at Bedford. The estimated cost of the scheme is £17,500, but part of it will not be carried out till the lease of some property falls in, 15 years hence. The plans show on the ground floor a shire hall, 60ft. by 30ft., parallel with the street, and having an open-timbered roof. On the west side are clerk of peace's offices, and on the east judges' lodgings, both with upper rooms. A crown court, 46ft. by 32ft., and civil court, 46ft. by 31ft., and indictment offices are to be provided at once, and above these a grand jury-room, 44ft. by 27ft., with open-timbered roof and a bay window looking upon the river. In the basement are a borough strong-room, a police room, staircases to the docks in either courts, and a range of w.c.'s and urinals. For heating the courts a combined system of hot air and hot water is proposed, the foul air being carried away from the courts into shafts surrounding the heating apparatus. The building is proposed to be of red brick, with red terra-cotta dressings, and covered with Broseley tiles or green slates. The designs were generally approved, but some magistrates expressed a fear that the ornamentation would be an unnecessary expense. They were finally adopted, subject to alterations which may be made by a committee of magistrates.

Brighton.—The church of St. Mary, St. James-street, which, owing to an accident while under restoration has been entirely rebuilt, was consecrated last week. The plan consists of a baptistery with tower (lower stage only) on one side, and porch on the other side, wide nave and aisles, transepts, choir, and apsidal sacrarium, with chancel aisles, and two vestries, with an ambulatory behind the sacrarium screen, from the clergy to the choir vestry. The total length is 171ft., and the width of the nave and aisles, with buttresses, is the same as that across the unbuttressed transepts—73ft. 6in. The nave is 64ft. to boss of vault, and 78ft. to ridge. The chancel windows are single—those of aisles two, and of transepts three lights, all traceried. The walnut-wood stalls have been executed by Mr. Lascelles, of London. The chancel is paved with mosaic, executed by Messrs. Burke and Co., of London, from the design of the architect. The space at the altar rail is very freely and most elaborately treated, and has three large figures representing Faith, Hope, and Charity, each in a scroll with a variegated border at the sides near the walls and steps. The rose window in the chancel aisle is filled with stained glass, representing "The Temptation in the Garden of Eden." This window, as well as the whole of the plain glazing, was done by Mr. Luxford, of London. The pulpit, which is executed in Caen stone, is an irregular octagon on plan. It has carved panels on the faces, and was executed by Messrs. Bennett Brothers, of the Lewes-road, Brighton. The font is carved out of a single piece of alabaster. It is circular in shape, and large enough to immerse an infant. About one-fourth of the circumference facing the altar is filled in with a representation of little children being presented to our Lord. The base is of Italian marble, the shaft is a piece of Swiss granite. The lectern is a large eagle of polished brass, by Messrs. Potter and Sons, of South Molton-street, Oxford-street. The coronæ and gas standards have been supplied by Messrs. Hart, Peard, and Co. The bench seats in the nave, aisles, and transepts are by Mr. Hammer, of London. They are of pitch pine, stained a chesnut colour, and will be varnished. The walls are built of red bricks externally, with Corshill red sandstone for string-courses, buttresses, slopes, and coping. The interior is of white bricks; the vaulting is of cement concrete. The peculiar feature of the transept arches is that they are askew. The nave roof is of a hammer-beam construction, and is boarded on the under-side of the circular ribs, and is divided into forty-eight large panels, with moulded ribs. The architect is Mr. William Emerson, of Westminster-chambers, London; Messrs. Colls and Son are the contractors, and Mr. James Redden has acted as clerk of works. The stone work was supplied by Messrs. Tilney and Son, and the external carving, where completed, was executed by Messrs. Williamson and Wills, of Brompton. Mr. T. Nicholls, of Hercules-buildings, Lambeth, furnished the models for the whole of this work. The total outlay has been £17,000. We hope to illustrate the building shortly.

Broad Hinton, Wilts.—The parish church of St. Peter, consisting of finely proportioned thirteenth century nave and chancel with Perpendicular western tower, is about to undergo conservative restoration under the care of Mr. Ponting, architect, of Lockeridge, Marlborough. The work consists mainly of securing the tower (which, from the bulging of the jambs of the archway into the nave, is in a very dangerous condition), re-covering the roof of nave, new roof to chancel, in place of the poor one put on 70 or 80 years ago, new organ chamber, and mortuary chapel, re-flooring and re-fitting the chancel and sanctuary, removing the whitewash from walls internally, repairing the porch and chancel crosses, pinnacles of tower and stonework generally, lowering and draining the ground around the building, underpinning the foundations, &c.

Clifton.—Hill's Almshouses, situated in Berkeley-place, Clifton, have received an addition in a building capable of being used as a chapel for the inmates or the board-room of the institution. The room is built from the designs of Mr. C. Hansom, architect, of Bristol, and is 32 feet long by 18 feet wide, and 30 feet high to the apex of the roof. Internally the stained-glass window, the chimney-piece, and the ornamental dado with which the lower part of the room is lined, add effect. The carving throughout of the chimney-piece is the work of Mr. E. Sheppard, of Bristol. The contractors for the work were Messrs. Wilkins and Sons, of Surrey-street, Bristol.

Dunston.—The consecration of the new church dedicated to St. Leonard, recently erected at Dunston, took place last week. The building, which is in the style of the Decorated period, is of stone throughout—the red sandstone of the district, faced internally with Bath stone. It consists of nave, transepts, chancel, vestry, and tower, the latter being surmounted by a spire. The east window, which has three lights, is filled with stained glass, by Camm Brothers, the subject being the "Ascension." The remaining windows are of grisaille glass. The accommodation provided in the fixed seats is for 120 adults and 40 children, and there is sufficient space for 50 chairs. The church was built from the designs of Mr. Griffin, architect, Darlington-street, Wolverhampton.

Ely.—Important works are in contemplation at the King's School, Ely, under a scheme for increasing the accommodation in this school, which was founded by Henry VIII. in 1542. The school is at present located in the ancient gateway known as Ely Porta, built by Prior Burton about 1380, and in other buildings, ancient and modern, situate between the Porta and the Galilee porch of the cathedral. A new hostel for sixty boys is to be built on a site opposite Ely Porta, and will include accommodation for masters' and servants' offices as well as dormitories, day-rooms, and studios for the boys. Alterations are also to be made in those of the ancient monastic buildings at present used as the head-master's house and dormitories—buildings re-floored and enlarged by the great architect, Prior Alande Walsingham, about 1180. The modifications will be made with care, so as to avoid altering their characteristic features as far as possible. The plans are in course of preparation for the dean and chapter by Messrs. Carpenter and Ingelow.

Holme Pierrepont.—The small parish church of Holme Pierrepont was re-opened on the 22nd instant, after restoration effected from the designs of Mr. T. C. Hine, of Nottingham, at a cost of about £2,000, the whole of which has been borne by Earl Manvers. The chancel has been entirely renovated. The mortuary chapel, which has of late years formed the organ chamber, has been further altered, the work including the removal of a mural monument to Princess Gertrude, Countess of Kingston, from the chapel to the south

side of the church near the tower. The nave seats have been re-varnished, while the choir stalls are entirely new, as is also the roof of pitch pine, stained and varnished. The lighting and warming (gas and hot water) have been re-arranged, the latter by Messrs. Bacon and Co., of London. A new stained glass east window to the memory of the late Earl Manvers, has taken the place of one removed to the north wall of chancel. The principal subjects are—in the centre, the Resurrection of the Saviour, on the right the two Marys, and on the left St. Peter and St. John. A new communication by means of a double arch has been opened between the chancel and the mortuary chapel. A new eagle lectern has been furnished, and the old reading desk does duty as a pulpit. The contractor for the works was Mr. R. Stevenson, of Nottingham; Mr. Green, manager of works.

Kirkstall.—A new Congregational chapel and schools at Kirkstall were opened on October 17th. The new chapel is designed in the Lancet style, the plan being nave, with aisles (the latter used only as ambulatories), transepts, chancel, vestry, and organ chamber. The length of the building is 78ft., and the width (across the transepts) 55ft. 6in., the height from the floor to the ridge 47ft. 6in. Under the chapel are seven good-sized class-rooms, and a school-room 55ft. 6in. by 41ft. by 18ft. high. The external wall stones are pitched faced, the internal wall stones are hammer-dressed (no plaster being used in the chapel), and all dressings are of tooled sandstone. There is accommodation for upwards of 400 people in the chapel. The cost of the building has been about £4,500. Messrs. S. E. Smith and J. Tweedale, Park-square, Leeds, were the architects.

Lancashire Police Stations.—Buildings for the county police have just been completed at Waterloo, near Liverpool. Two others are in progress at Ashton and Wavertree, and another is about to be commenced at Skelmersdale. These stations have been designed by Messrs. F. and G. Holme, of Liverpool, under whose superintendence important alterations are being carried out at the County Police-buildings, Ormskirk.

Liverpool.—The Countess of Derby will shortly open the new college for girls in Grove-street, Liverpool, which is nearly completed, having been designed by Mr. John Johnson, of Chandos Chambers, Buckingham-street, London, and erected by Messrs. Brown and Backhouse, builders, of Liverpool. The style is Perpendicular. White stone has been used in the construction and local bricks. The ground floor contains four class-rooms and the first floor six, each room being nearly 600 square feet in area and 14 feet high. The second floor contains class-rooms for music and drawing, a spacious hall with an area of 41 feet by 25, well lighted from the top, intended to be used as a lecture-hall. Dormitory accommodation is also provided for teachers and servants on this floor. A good gymnasium is also erected on the basement. The building is calculated for the accommodation of 360 pupils.

Llanywynech. — Several improvements have been made in the internal arrangements of this church, which was built about 40 years ago. The wooden pulpit and reading-desk, &c., have disappeared, and the eastern part of the nave has been raised and fitted with oak stalls for the choir, who are now supported by the harmonium, removed from the west gallery. Some additional free seats have likewise been obtained. The memorial pulpit, of Caen stone, is the gift of Mrs. Luxmoore. The chancel is now conveniently arranged, and the floors are laid with Maw's encaustic tiles. An oak altar-rail, with metal standards, is provided, and the altar is raised two additional steps. The roof timbers of the nave and chancel have been stained and varnished, and the walls have been thoroughly cleaned and coloured; the ceilings also have been cleaned and whitened. Mr. Haycock, of Shrewsbury, was the architect, and Mr. W. Bowdler, the contractor.

London School Board.—At the weekly meeting of this board on Wednesday amended tenders from Messrs. Higgs and Hill, of Crown Works, South Lambeth, were accepted for new schools for 800 children, in Albion-road East, Chelsea, and Church-street, Lambeth. In the Chelsea school the cost is at the rate of £8 19s. per head for actual buildings, and £10 6s. for these and accessory works; in that at Kennington the rates per head are £8 7s. and £9 11s. 8d. respectively, and in both cases a deduction was made owing to the fall of 3d. per foot in the price of tar paving. For the supply of furniture and fittings to the new school in Shepperton-road, Islington, accommodating 571 children, £464 12s. 3d. was voted, being at the rate of 16s. 3d. per head. The works committee having made a report with reference to the recent action of the Education Department, refusing for the future to recommend a loan for school buildings (not including site) to cost more than £10 per child, the committee explained that on applying for a loan a request was made for departmental sanction for (*a*) the amount of tender accepted, (*b*) 20 per cent. for extras and contingencies, (*c*) 5 per cent. for painting the school throughout at the expiration of three years from date of opening, (*d*) 6 per cent. of the foregoing items to cover cost of architect's department and clerk of works' salary, and (*e*) estimate of 14s. to 16s. per head for school furniture. These items amount to a total of 40 per cent. on the tender, and have not hitherto been found much in excess of requirements. Hence, if the £10 limit be adhered to by the department, future tenders for schools must not exceed £7 2s. 10d. per head, or omitting possible extras, £8 6s. 8d. An addition of 20 per cent. to the cost of board schools has resulted from the new rule of the department, that all rooms shall be 22ft. wide, and that only five rows of deal desks shall be placed in them instead of six as hitherto. A reply was ordered to be sent to the Education Department to this effect, and urging that on account of the higher cost of labour in London than in the country the department would be justified in modifying their decision so as to suit the exceptional circumstances of the metropolis.

Metropolitan Board of Works.—At this board on Friday a deputation was received from the Fulham district board in support of a memorial urging the necessity for the extension of the main drainage system. The matter was referred to the works committee. A discussion took place as to the desirability of testing the value of the electric light, the works committee having recommended the board to accept an offer made by the Société Générale d'Electricité of assistance in exhibiting the Jablochkoff light. It appeared that the light is proposed to be tried for 15 days along the whole length of the Victoria Embankment, and subsequently, if thought desirable, upon Waterloo-bridge. The board agrees to provide a 25 horse-power engine, and to pay the cost of materials, wages, and labour. The expense of the fortnight's trial is estimated by the board's engineer at £600. The experiment was objected to on the ground that it would be premature and costly; but a large majority of the board decided to carry it out. As to the proposed Tower-bridge, a communication was received from the Court of Common Council of the City that they would co-operate in obtaining the continuance of the corn and wine duties till 1900, so as to provide funds. A report from the works committee, pronouncing the plan of the board's engineer preferable to one propounded by Messrs. Dredge and Woodifield for a high-level bridge between Irongate Stairs and Hartley Wharf, Horseydown, was adopted. A letter was received from the Royal Institute of British Architects, stating that a certificate of competency to perform the duties of district surveyor had been granted to H. Hewitt Bridgman. After a lengthened debate on the question of the purchase of the water companies' undertakings, the following resolution was adopted by 16 votes to 6:—"That it be referred to the Parliamentary committee to prepare and lay before the board a bill for the compulsory purchase of the interests of the Metropolitan water companies, with power only to issue the necessary Parliamentary notices, and that the whole subject be referred to the works and general purposes committee, with power to confer with her Majesty's Government, with a view to obtain their approval of the same previous to any further expenditure being incurred."

Oxford.—The new Wesleyan chapel in New-inn-hall-street, erected from the designs of Mr. Charles Bell, of Union-court, Old Broad-street, E.C., was opened on Friday. The style is Decorated, of the latter part of the 14th century. The front elevation consists of a centre gable, flanked on the one side by a tower and spire, and on the other by a gabled entrance to gallery. The tower doorway being exactly opposite Cornmarket-street, is treated in a richer manner than the other parts. The tower itself has only flat buttresses, and at the angles are pinnacles; from canopied broaches springs the spire, and rises to a total height from the ground of 130ft. The external walls of chapel are of Gibraltar hammer-dressed stone, with Box Ground and Cuxham Bath stone dressings. The side elevations are divided into six bays by projecting buttresses, with a three-light traceried window in each bay, and coupled lancets below. On the ground floor are sittings for 600 persons, and in the galleries 250 other seats. The columns supporting the galleries are of iron, arranged in two positions. The spandrels of arches are filled with diapered brickwork, and the roof, which is of hammer-beam construction, with no cross-ties, has a span of 26ft. In an arched recess at the end of the chapel is a platform pulpit, and behind and above it a rose window, filled, like the large six-light window at the other extremity of the chapel, with stained glass of floral patterns. The organ chamber is to the left of the pulpit. The warming is by Grundy's hot-air system. Ventilating is provided by openings in each window, and by vertical tubes discharging in the sills. The gas jets are arranged round each arcade capital. The builders are Messrs. Symm and Co., of Oxford. The stained and other glass is by Mr. Thomas Cox, of Southampton-row, W.C., and the railings by Messrs. Marshall, of Cheltenham. The carving, which includes examples of the foliage or flowers of the maple, oak, thorn, blackberry, rose, and passion flower, has been executed by Mr. Henry Frith, sculptor, of Gloucester. The total cost has exceeded £7,000. We illustrated the chief front of the chapel on Feb. 18th, 1875.

Wellington.—The parish church of Wellington, Salop, has been reopened after restoration. There was found to be only one way of securing the double object of the alterations—to obtain increased accommodation adequate to the wants of the parish, and a properly arranged chancel—and that was to cut off a portion of the east end of the nave and divide it from the remainder of the nave by a triple arch, and to construct two chancel aisles in a transept form. The style adopted in the additions is of a very simple Early Pointed character. The floor of the chancel is paved with Godwin's encaustic tiles. The architect was Mr. Kempson, of Hereford. Mr. Wilcox, of Chanel's Pitch, Colwall, carried out the works. The cost of the alterations will be about £750.

The memorial stone of a new Congregational church at Brighton was laid on Thursday afternoon, the 17th inst. The church will be on the west side of Lewes-road, and will be Italian Gothic in style. The chief front will be of Kentish rag polled ranged stone, with Box Ground Bath dressings; the other walls will be of brick and freestone. Accommodation will be provided for 400 persons at present, and with galleries for 694 persons. Mr. A. Harford, of Broad-street, Bristol, is the architect, and the work will be under the superintendence of Mr. Arthur Loader, of Brighton. The contract has been let to Mr. James Longley, of Worthing, at £2,724.

The annual dinner of the operative slaters of Lincoln took place on Saturday last at Newland. The chair was occupied by the representative of the late Mr Jebb, slate merchant.

At the meeting of the Brighton Town Council on Wednesday week, Mr. Edward Easton, C.E., was appointed waterworks engineer, with 3 per cent. commission on new works of a special nature.

The new Albert Hall in Aberdeen-walk, Scarborough, was opened on Monday week. The style is Gothic, and the cost of the building, including a suite of rooms to be used by the Liberal Club, has been £6,000. The principal room is 60ft. by 30ft., and is provided with stage and gallery and retiring accommodation. Mr. John Hall was the architect, and Mr. W. C. Malton executed the contract for brick, stone, and plaster work; Mr. Scales that for joinery; and Messrs. Whittaker Brothers that for ironwork.

More than Fifty Thousand Replies and Letters on subjects of Universal Interest have appeared during the last ten years in the ENGLISH MECHANIC AND WORLD OF SCIENCE, most of them from the pens of the leading Scientific and Technical Authorities of the day. Thousands of original articles and scientific papers, and countless receipts and wrinkles embracing almost every subject on which it is possible to desire information have also appeared during the same period. The earliest and most accurate information respecting all new scientific discoveries and mechanical inventions is to be found in its pages, and its large circulation renders it the best medium for all advertisers who wish their announcements to be brought under the notice of manufacturers, mechanics, scientific workers, and amateurs. Price Twopence, of all booksellers and newsvendors. Post-free 2½d. Office: 31, Tavistock-street, Covent-garden, W.C.

TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.]

All letters should be addressed to the EDITOR, 31, TAVISTOCK-STREET, COVENT-GARDEN, W.C.

To Our Readers.—We shall feel obliged to any of our readers who will favour us with brief notes of works contemplated or in progress in the provinces.

Cheques and Post-office Orders to be made payable to J. Passmore Edwards.

ADVERTISEMENT CHARGES.

The charge for advertisements is 6d. per line of eight words (the first line counting as two). No advertisement inserted for less than half-a-crown. Special terms for series of more than six insertions can be ascertained on application to the Publisher.

Front Page Advertisements and Paragraph Advertisements 1s. per line. No front page or paragraph Advertisement inserted for less than 5s.

Advertisements for the current week must reach the office not later than 5 p.m. on Thursday.

TERMS OF SUBSCRIPTIONS.

(Payable in Advance.)

Including two half-yearly double numbers, One Pound per annum (post free) to any part of the United Kingdom; for the United States, £1 6s. 6d. (or 6dols. 40c. *gold*). To France or Belgium, £1 6s. 6d. (or 33f. 30c.). To India (*vid* Southampton), £1 6s. 6d. To any of the Australian Colonies, New Zealand, the Cape, the West Indies, Canada, Nova Scotia, or Natal, £1 6s. 6d.

N.B.—American and Belgian subscribers are requested to remit their subscriptions by International P.O.O., and to advise the publisher of the date and amount of their remittance. If the last-mentioned precaution is omitted, some difficulty is very likely to arise in obtaining the amount. Back numbers can only be sent at the rate of 7d. each, the postage charged being 3d. per copy. All foreign subscriptions, unaccompanied by an additional remittance to cover the extra cost of forwarding back numbers, are commenced from the next number published after the receipt of the subscription.

Cases for binding the half-yearly volumes, 2s. each.

Received.—W. D., jun.—T. H. C.—S. and S.—T. E. L.—G. P. B.—C. and S.—T. B. I. C.—W. G. and Son.—C. H. and Son.—M. R. C.—W. N. J.—J. G.—I. D.—H. M. T.—B. of S.—R. P. C. Co.—S. F. H.—T. S. Co.—N. L. B.—P. McF.—E. E. C.

Drawings Received.—E. A. T.—E. L. C.—W. R. L.—H. O. and Son.

A Countryman. (The Institute has spoken out quite as strongly on the matter, and we have had enough about it in our own columns. That illicit commissions are received is but too probable, but not by respectable members of either profession.) — Young Builder. (Write B. T. Batsford, 52, High Holborn.)—Architect. (We know of none.)—Assistant. (We fear the distress referred to is by no means confined to the class named. We do not see either any reasonable prospect of efficient organisation or distribution of the proposed fund, or if that were probable why others should not share it. We fear if it were started it would soon become simply an encouragement to genteel pauperism—perhaps to dishonesty. There is already an association—the Architects' Benevolent Society—but half as well supported as it ought to be, which would doubtless gladly extend its aid if in its power. Any such efforts as those you propose had far better be made to help an already existing institution than to start a new one.)—C. Hastilow and Co. (No neighbour can block out a light enjoyed for a term of 21 years. In answer to your second question 21 years' undisturbed possession, without paying rent, constitutes a right.)

"BUILDING NEWS" DESIGNING CLUB.

Drawings Received.—Vivo in circle, Q in square, St. Lucy, Yesram, Omega, Semper Spiro, Spero, Frappefort, Ora et Labore, Umble Uriah, Daisy, Curiose, Iota, Cleo, Spero Meliora, Che Sara Sara, Ogmore, Mechlin, S in circle, Signum, Nil Desperandum, P in triangle, Omnia Vincit Labor, Prenez Garde, Heliogabalus, E. J. S. in circle, Tom Bowling, Peckniff, H in circle, Dalgarno, Use, Semper Fidelis, Percy Vere, Ich Dien, Tam O'Shanter, East Anglian, Semper Fidelis (2), Cymraeg, Cross in circle, Cyprus, M leaves in circle, Enigma, "Through" with dagger, Chimney-pot, C in circle, Jack Spratt, Amateur, Try, Jac, J., Maltese Cross, Motto, B. M. W., Sunflower, Stone in circle, Peto in circle, R.

M. P. Hapgood, Boston, U.S.A. (If time permitted we should be only too glad to admit Transatlantic students to the club, but we cannot see our way to announce subject sufficiently long beforehand. We will reply further in our next.)—C. R. D., "Design." (Your drawing now to hand: it must either have been misdirected, or not prepaid. We cannot undertake to receive unpaid parcels.)—Bonnie Dundee. (Too late.)

The large number of designs we have received renders it impossible to publish our review this week. We hope to do so in our next number, and shortly to illustrate the selected design. It would save much unnecessary labour if competitors would put all information on their drawings, or append it to them.

LIST OF SUBJECTS.—NO. 2.

1. A village club-house, with a street frontage, providing a meeting hall and committee-room, library, billiard-room, and refreshment bar, and offices, including a bedroom for the attendant; cost £1,500; style half-timbered; scale ¼th inch to the foot. 2. A sheet of details to the above to ½in. scale.

Correspondence.

CISTERN FILTERS.

To the Editor of the Building News.

Sir,—Under the head "Cistern," in your useful "Commonplace Column," you say, "Cistern filters, such as Lipscombe's, are necessary." Having recently had an analysis made of the water passed through a cistern (not Lipscombe's) rented from a filter company, I found the filtered water worse than the unfiltered in the same cistern. I believe the same result would be found in the case of all charcoal filters after a short period of immersion. If so they would appear to be unnecessary. I would invite others of your readers to try the same experiment.—I am, &c.,

John P. Seddon.

1, Queen Anne's-gate, Oct. 21.

[Some recent experiments made by Mr. F. de Chaumont, of the Army Medical School, Netley, appear to confirm Mr. Seddon's conclusions. They show that water left in contact with the filtering medium (if that medium be charcoal) is certain to take up organic matter from it, sometimes becoming more impure than before. It also places the filter at a disadvantage, by depriving it of any access of air. A filter attached to a cistern outside is in a different position, for there the water merely passes through the medium, which can be got at easily and cleaned or renewed.—Ed. B. N.]

OAK AND CHESNUT.

Sir,—As my chapters are written, and the pen is thrown down, I would gladly—if anywhere unwittingly contentious—persist no more. Mr. Blashill, for the matter of that, might don triumphantly the wreath he covets, with "*Oakum* qui meruit ferat" for a motto. But, thrice to slay the slain would be mild if compared with an attack on an ally, and a summons to surrender a cause one has not espoused! With a vocabulary less pungent than his own did I not denounce a certain theory as "in all probability of no higher authority than the statements met with in guides and textbooks concerning the chesnut, and only in a less degree delusive and deserving to be stamped out!" ? (p. 315). To go much beyond that might seem arbitrary! The text I indicate is this:—First: An assertion was long sustained and widely accepted that chesnut was of frequent, if not general, use in ancient carpentry. But information of a more accurate and reliable kind, confirmed by practical demonstrations, affords convincing proof that oak was exclusively so employed. Second: Oak is best recognised by the silver grain which is apparent in cross-cuts and radial sections, but not on tangential surfaces. It is, consequently, invisible in fixed timbers of the largest dimensions; and, in order that error may be more readily prevented or controverted, secondary and outward appearances must be regarded. Some of these are attended to at p. 315. The corresponding features of chesnut should also be studied, and are indicated at p. 261.

There is not so much as an admission that a single instance of chesnut in old English carpentry ever occurred, nor is any merit attributed to the opposed opinions improved information would bring into conformity; but the fact is absolute that the assertions have been made, and the opinions expressed. Greater familiarity with chesnut is desirable and might be promoted by means of small veneers; or, with equal effect and combination of a test, by parquet floors. Inlays of various woods, systematically grouped, and decoratively applied, would not, perhaps, be inappropriate in the proposed new hall of the Institute. I hope Mr. Blashill will endorse this.—I am, &c.,

Thomas Morris.

CHESNUT AND OAK ROOFS.

Sir,—Is the following of any use in the dispute now going on in your journal—"Oak *v.* Chesnut?" If it is, publish it. Loudon was supposed to know something about timber, I believe.—I am, &c.,

Clement W. Chapman.

20, Lawrence-lane, Cheapside, London, Oct. 22., 1878.

"A mistake has been made, both in England and on the Continent in supposing that the woodwork of Westminster Hall, and that of the roofs of many of the oldest of the Continental churches, are of the sweet chesnut, and not of oak. The fact is that there are two, if not three, distinct kinds of British oak. The two which are clearly distinct are the *Quercus robur pedunculata* and *Quercus robur sessiflora*, and the differences between these are found alike in every soil and situation. The third, or deer-mast oak, is not so strongly marked, and in many situations it appears to approach so nearly to the *Quercus robur sessiflora* as to be scarcely distinguishable from it. The wood of the *Quercus robur sessiflora*, though not suitable for ship-building, as it decays in salt water, is yet very strong and durable when kept dry. The wood of the *Quercus robur pedunculata*, when planed, is found to contain a large proportion of the silver grain or medullary which the workmen call the flower in the wood The wood of the *Quercus sessiflora*, on the contrary, is so deficient in this as not to be distinguishable at first sight from the chesnut, and hence the mistake alluded to. The wood of the chesnut, however, though tough and tolerably durable when young, is not at all so when it has attained the size of a timber tree. It is, indeed, very rare to meet with any chesnut trees the trunks of which are about a foot in diameter that have not their wood rendered quite worthless by a disease called dialling."—Loudon's "Arboretum Fructicetum Britannicum."

ALLEGED NEGLECT OF A SURVEYOR.

Sir,—Seeing in your paper of Saturday last (on page 393) that my name appears in connection with a conviction against Francis Swinford, a builder, and it intimates that he was summoned through my neglect, I beg to state that Francis Swinford is quite unknown to me, and I have not received instructions to prepare drawings for any one of that name. I rely on your sense of justice to insert this reply, as the article in your paper is calculated to do me an injury in my profession.—I am, &c.,

Richard Tomlinson.

Gunnersbury, Oct. 22.

In consequence of complaints that the concrete pipes used in the main sewerage works at Bournemouth were defective, the town improvement commissioners engaged the services of Messrs. W. Donaldson, of Reading, and A. C. Ponton, of Parkstone-by-Poole, engineers, to inspect and report on the materials. They have reported that after applying tests they condemn the concrete pipes as unfit for sewer purposes. At a subsequent meeting of the Bournemouth commissioners it was resolved that no more of the concrete pipes in question should be used in the sewers.

The Thornton-with-Fleetwood School Board at their last meeting considered plans for the new school to be erected in Blackiston-street, Fleetwood, and those of Mr. Seward were approved of.

New Congregational Sunday-school and class-rooms at King's Lynn were opened on Thursday, the 17th. They have been constructed at a cost of £500 by Mr. Fayers, of Broad-street, Lynn.

A new hotel, to be known as the Imperial, in Paragon-street, Hull, was opened last week. There are, with cellars, kitchens, &c., upwards of 100 apartments—the bed and dressing rooms alone numbering 65. On the ground floor are the news-rooms and private rooms, a sale-room, 60ft. by 21ft., and billiard-room. There is a hoist from the ground floor to top of building, and on every landing are bath-rooms and lavatories. On the top of the building is a series of cisterns, holding 4,000 gallons of water. The upholstery and furniture were furnished by Messrs. Richardson and Sons, of Hull, and the chandeliers, &c., by Messrs. King and Co.

The restoration of St. Michael's Church, Lewes, is approaching completion, and it is proposed to reopen the church on November 20th. During the past week stained glass has been placed in the east window. The centre light represents the Crucifixion, and in the two side lights are figures of the Virgin Mary and St. John the Evangelist. It has been executed by Messrs. Powell, of London.

A new church is about to be built at Port Erin, near Rushen, Isle of Man. Mr. James Cowle, of Douglas, I.M., is the architect, and the contract for erection has been taken by Mr. James Costan, jun., of Colby.

A lecture has been given at the Trocadéro by the French architect, M. Paul Sedille, on the subject of the employment of polychrome in architecture. He urged that although the climate of Northern Europe was injurious to fresco, as seen in the disastrous attempts at Munich, there was no reason why terra-cotta and mosaic decorations should not be employed, and he strongly recommended the use of these materials.

The four niches of the northern porch in the new nave of Bristol Cathedral have now been refilled, statues of the four Evangelists having taken the place of the deposed Latin Fathers. Those of St. Mark (given by the Duke of Beaufort) and St. Luke were unveiled a fortnight since, completing the quartette.

Intercommunication.

QUESTIONS.

[5559.]—**Red Broseley Roofing Tiles.**—Will any kind reader inform me if these tiles are porous? What is the lowest pitch of roof, and the gauge to effectually keep out the rain? Also if any buildings near London are covered with them?—Rain In.

[5560.]—**Stability of Wall.**—Will some reader give me the usual rule for finding the thickness of walls of a building, allowance being made for pressure of wind, &c.? An example worked out for a wall 20ft. long and 30ft. high, without any intermediate support or stiffening by floors, &c., would greatly oblige—J. X. B.

[5561.]—**Curve of Equilibrium.**—Will some reader explain the catenarian curve—or I believe it is called the curve of equilibrium—and how is it obtained, as applied to semicircular arches?—J. X. B.

[5562.]—**Cesspools.**—I would like to know the way to calculate the size of a cesspool for a country house, and the best way of constructing same?—Pecksniff.

[5563.]—**Laying out Houses.**—Is it usual or necessary for an architect who has to design a house for a site of about 4 acres to take a spirit-level and staves with him to ascertain the formation of the ground; or what is the method adopted?—Pecksniff.

[5564.]—**Wire and Lead Gauge.**—Can the weights of milled lead be tested by the Birmingham wire gauge, and, if so, will some one inform me how this can be done, by giving a table showing the Nos. on the gauge that would stand for the various weights of lead?—H. G. B.

[5565.]—**Sewerage of Small Towns.**—Will some correspondent kindly state what is the best material for a filter-bed to purify the sewage before delivering into a stream, or give the name of some good work treating on the subject?—B. T.

[5566.]—**Heating Circular Shed.**—Will some one of your numerous readers kindly give me, through your columns, the best and cheapest mode of heating a shed 26ft. wide round a Hoffman's kiln? The shed forms an annular one round the kiln, and there is a centre stack 133ft. high.—C. B., T. P. Works.

REPLIES.

[5514.]—**Damp Walls.**—Mr. Blashill, in confirmation of my argument, clings to the idea that thick solid walls must be impervious, despite the evidence of many who could inform him otherwise. Mr. Blashill says: "It is an ordinary case to find a costly house built of good hard bricks and good mortar, with the usual 2in. hollow, and yet the house is so damp as to be uninhabitable." Though not so ordinary as imagined, it is very true; but the cause is equally easy to detect, and the remedy soon made. Of course, as in other things, there is a proper and an improper manner of cramping. No one acquainted with building denies the last assertion of Mr. Blashill that other causes of damp than direct transmission exists. I have seen, for example, damp ceilings and walls caused by percolation downwards from chimney stacks and parapets, and upwards from defective damp courses, and various other ways; but I defy a properly-constructed hollow wall to admit damp through it.—G. W. G.

[5514.]—**Damp Walls.**—To cure these I would recommend your querist, "Architect," to use "Simmonds's Worcester Excelsior patent damp-proof." About three years ago I applied it to the wall (through which the wet passed) on the west side of a house of mine, with the best results. In 12 or 13 months after its application all symptoms of damp disappeared, and the inside of the wall is now perfectly dry. I believe it has also been used on other buildings with the same results.—J. Wilesmith.

[5514.]—**Damp Walls.**—Having used hollow walls, thick walls, walls coated with every variety of composition, in exposed seaside places, without attaining successful results, I have given the system invented by Mr. John Taylor, of Birchington-on-Sea, Isle of Thanet, some trials, and am perfectly satisfied with it, and believe, with the exception of unsightly external coatings of slating, it is the only method to attain the object so many of your correspondents desire—that, namely, of securing a perfectly dry interior to buildings in exposed positions.—J. P. S.

[5527.]—**Lawn Tennis.**—I should think clayey earth, pounded, would make a good floor; at any rate, I should try it first, as a hard floor is not required for lawn tennis. Cement would not do, as it would have to be darkened: and that is not an easy matter,—C. F. M.

[5547.]—**Drainage of Cemetery.**—It is necessary first of all that a good outlet be provided. Supposing this is obtained, lay a drain or drains to divide the area as nearly as possible, or in a convenient part, into which minor drains of agricultural drain tiles should lead.—H. G.

[5549.]—**Discharge of Sewers.**—If "Student" wants to know the discharge of any sewer his simplest plan is to consult a table. Such tables will be found in Hurst's, Molesworth's, and other pocket-books. The formula used most frequently is Eytelwein's, and is $V = \cdot 9091 \sqrt{2Hr}$, or the velocity per minute = the square root of twice the fall in feet per mile, multiplied into the mean radius or hydraulic depth, and by 55. But the readiest and safest plan is to refer to a table, such as that in Latham's "Engineering," p. 148, for oval sewers. Here the inclination is given from 1 in 100 to 1 in 4,000 of any size from 1ft. × 1ft. 6in. to 6ft. × 9ft., and the discharge in cubic feet per minute. If "Student" furnishes me particulars I may be enabled to tell him.—G. H. G.

[5549.]—**Discharge of Sewers.**—The following formula, which was adopted by the late Mr. Beardmore, and has been found to be very reliable, "Student" will find to meet his case:—

$$V = 55 \sqrt{R} \times 2 H.$$

R = hydraulic mean depth in feet; H = fall in feet per mile; V = velocity in feet per minute.—S. E. T. Ormesby.

[5550.]—**Brick Machine.**—"Brickmaker" will be able to procure a useful machine, capable of making 4,000 bricks per day, if worked by horse-power, on application to M'Donald and Co., of the Atlas Foundry, Middlesborough.—S. E. T. Ormesby.

[5551.]—**Valuer's Licence.**—I do not remember having seen the answer referred to by "J. P. O." I am quite aware that some people make valuations for mortgages without taking out a licence. The practice is illegal, as is sometimes proved when such a case comes into the courts or reaches the knowledge of the Inland Revenue. I remember a case that was brought before the magistrates some short time since, in which a gentleman had carried on the practice for years. He was fined (if my memory serves me) the sum of £20 and costs.—S. E. T. Ormesby.

[5551.]—**Valuer's Licence.**—"J. P. O." is wrong in saying architects take out licences. He must mean valuers.—Architect.

[5552.]—**Classical Mansion.**—There is no modern work on the Italian style. "Alpha" wants details and elevations. He had better consult the illustrations that have appeared in the professional journals. The Building News has of late contained many. I have all the leading works on Italian, and, with the exception of a few of the old treatises by Vignola, Perrault, and Fergusson's Handbook, they are useless to the architect in quest of detail.—G. H. G.

[5553.]—**Elizabethan—Italian Decorations.**—It is difficult to advise without seeing the room what colours should be used. For the panelled dado a drab or citrine of dark tone may be employed, the framing being a shade darker than the panels. The walls should be of a lighter shade of the same colour on an olive green or grey. Woodwork of doors, &c., should correspond with dado. The frieze may be of a brighter colour—say, a crimson or French grey. Shades of buff with white and gold in the mouldings may be employed, but I should prefer the more subdued colours.—G. H. G.

[5554.]—**Glazing Mullioned Windows.**—Fill the upper part above transoms with metal quarry-shaped lights, the centre portions of which might be made to open. Metal frames are the best. The quarries may be diamond-shape or squares, and circles alternating.—E.

[5556.]—**Building Estates.**—The charge for making plan of estate depends on area, and is generally made by arrangement. For block plan, showing roads, sewers, &c., from 2 to 2½ per cent. for a small estate, specifications included; for superintendence another 2 per cent. For letting plots one year's ground rent is charged. Working plans and superintendence, 3 to 4 per cent. The charge is generally made to the leaseholder.—Surveyor.

[5557.]—**Ruskin's Works.**—In reply to your querist, "B. B. B.," Professor Ruskin's "Modern Painters and Stones of Venice" can still be had of Messrs. Smith, Elder, and Co., publishers, London. The other series, comprising all works published during the last eight years, including "Fors Clavigera," are to be had only from Mr. George Allen, Sunnyside, Ossington, Kent. His other works are mostly out of print.—J. M.

[5558.]—**Variation of the Compass.**—The declination of the compass in London at the present time is about 20° W.—*i.e.*, the magnetic needle points about 20° west of true north. The declination, however, is constantly varying. In London, about the year 1580, the declination was 11° 15′ E.; in 1657 the needle pointed exactly north; from that date the declination to the West gradually increased, until in 1815 it attained 24° 27′ W. Since then the needle has gradually been turning eastward, being now, as before stated, 20° W.—A. J. C.

At Norwich cemetery, on Thursday, the 17th, Lord Waveney unveiled a monument erected by subscription to the memory of deceased soldiers of regiments stationed in the city. The memorial is from the designs of Mr. John Bell, of London, himself a Norfolk man, and the stone pedestal and the work of erection were carried out by Mr. F. Want, of Heigham, Norwich. The upper part is a female armed figure representing "the Spirit of the Army," cast in terra-cotta, by Messrs. Doulton, of the Lambeth Potteries. The names of the soldiers buried in the plot of which the monument forms the centre will be inscribed on the faces of the pedestal.

Our Office Table.

The Science and Art Departmeat have lent to the Salisbury School of Art the whole of the works (340 in number), which have gained the highest awards in the recent national art competition at South Kensington. These are a selection from the 1,400 works referred to national competition out of the 138,045 drawings, paintings, &c., sent up for examination in April last by the 142 schools of art in the United Kingdom. The works exhibited are of large variety, including studies of the figure from the life and antique in chalk, monochrome, water colours and oil, anatomical studies, paintings of groups as compositions of colour, designs for fabrics and manufactures, studies in sepia, from casts of ornaments and natural objects, studies of flowers, fruit, and foliage from nature in water colour, oil, and tempera, machine and architectural drawings from actual measurement, designs for churches and other buildings, ornamental forms derived from natural objects, studies of historic ornament, and also the Watherston loving cup, Owen Jones, and Plasterers' Company selected designs. We critically described the designs when on Exhibition at South Kensington in May or June last.

The little city of Llandaff has speedily followed in the steps of the metropolis in providing a peal of bells to be hung in the cathedral towers. The dean and chapter of Llandaff have accepted the tender by Messrs. Mears and Stainbank, bellfounders, of London, for casting and placing in position, at the cathedral church, seven new bells, of such tone that the present bell will form the tenor of the peal. Other works are proceeding in the cathedral church under the superintendence of the diocesan architect, Mr. John Prichard. The whole of the internal carving on roofs and walls has just been completed, as has also been the roof of the south aisle, the last of the structural restorations. It is intended, so soon as funds permit, to erect a series of choir stalls, and also to carve the ends of the seats in nave. The latter work has been commenced in several parts; as to the former work Mr. Prichard has stated in a newspaper correspondence which has appeared this week, that he has preferred to adopt an original mode of treatment in the stall designs as more appropriate and historically honest in a case where every vestige of the original work has been lost than any attempt to copy ancient examples could be.

The winter exhibition at the Grosvenor Gallery will open in December, and will consist, as last year, of drawings by the old masters and water-colour drawings of the British School. In the first of these two sections the names of nearly all the former contributors will again make their appearance in the catalogue. Several new names will also be added to the list. The important series of Dutch and German drawings, possessed by Mr. Holford, of Park-lane, have been placed at the disposition of the committee, and Dutch art will be further represented by liberal contributions from Mr. Roupell, Mr. Danby Seymour, Mr. Heseltine, and Mr. Seymour Haden. Lord Pembroke will send from Wilton very important examples of Holbein and Raphael; and there is a prospect that some of the great foreign collectors, including M. Relset, the director of the Louvre, and M. Dutuit, of Rouen, will also contribute. In the section of the exhibition devoted to water colour it has been decided to complete the historical survey of this branch of art by a loan collection of the works of living masters. The display will thus serve as a continuation of that of last year, wherein was set forth the earlier efforts of water-colour painting. In order, however, not to destroy the essentially historical character of the undertaking it has been decided to fix a limit of five years, and drawings executed within that time will not be deemed eligible for the purposes of the exhibition.

The opening meeting for the present session of the members of the Society of Medical Officers of Health took place last Friday evening at the Social Science Rooms, Adelphi, under the presidency of Dr. Thomas Stevenson, who

gave an inaugural address on the "Acquisition and Distribution of Sanitary Knowledge by the Medical Profession," enforcing with particular emphasis the desirability for the advancement of sanitary science, of hygiene, or what might be termed preventive medicine, forming an obligatory and systematic part of the instruction given at our medical schools. Attention was drawn by Dr. Dudfield to the recent case in a Registration Court, in which a person's vote was objected to on the ground that his child had been a patient in the district small-pox hospital, and strong opinions were expressed that sick relief of such a kind ought not to pauperise, but be placed on the same footing as gratuitous vaccination. The matter was ultimately referred to the council to take what steps they might consider advisable, with a view of obtaining an amendment of the law. The report for last year, which was presented, states that the society now consists of 158 members, of whom 36 are metropolitan, and 67 country members. For the present session papers are promised to be read, amongst others, on "Past Sanitary Work," by Mr. Leach; on "Autumnal Diarrhœa," by Dr. Buchanan; and by Dr. A. Haviland, on "The Climate, Geology, and Distribution of Diseases in London."

Sir Edward C. Kerrison, Bart., of Oakley-park, Suffolk, has just presented to St. Edmund's R. C. Church at Bury St. Edmund's a Gothic alms-box formed of oak, taken from the tree at Hoxne traditionally ascribed to be the one to which "Edmunde ye Martyr Mayde and Kyng" was tied at his martyrdom by the Danes, A.D. 870. The tree, known to many generations as "Saint Edmund's Oak," stood in a field in the parish of Hoxne, close to Oakley-park, and on September 11th, 1848, when it fell, seemed in full vigour. The branches spread over a width of 28 yards, and were expansively leaved; the trunk, shivered in the middle, was 20ft. in circumference. The annual rings were pronounced by competent judges to show a growth of over a thousand years. An extraordinary coincidence is, that there was found embedded in the trunk, about a man's height from the ground, an arrow-head: this relic has been carefully preserved by Sir Edward Kerrison, who has erected a Runic cross on the site of the old tree.

For ventilating, moistening, and cooling the air in work-rooms, and for drying wool and other substances, Herr Lohren, according to the *English Mechanic*, has patented an apparatus (in Germany), in which a ventilator is introduced between two drying chambers, so as to work by suction in the one chamber and by blast in the other on the material to be dried. In this way the same quantity of air is used twice for drying, and by alternating the function of the two chambers an uninterrupted action is secured, and the waste of air and force arising through removal of the dried, and introduction of the fresh material, is reduced to a minimum. To use the apparatus for ventilation of different rooms the pipe for admission of air is connected with a passage, which communicates by closable openings with the rooms to be ventilated. When cool or moist air is desired both temperature and the degree of saturation can be regulated by introducing at suitable parts of the exit passage open vessels containing water, ice, or cold mixtures, through which the issuing air must stream before it comes to the rooms.

We have seen the preliminary prospectus of a new attempt at co-operative housekeeping. It is proposed to acquire an estate of 120 acres near London, and to build thereon a series of detached dwellings, together with several ranges of what the projector calls "arcade-dwellings," which are to consist of suites or pairs of rooms, divided by open spaces, which are to be roofed with glass, and used as public promenades. Co-operative stores, dining-rooms, baths, and pleasure grounds are to be provided, and everything is to be done at the least possible cost, and in the best possible style. The projector has, we believe, had considerable experience in other forms of co-operation, and is enthusiastic about his scheme. No plans are yet prepared, nor, so far as we know, is any architect actually engaged, though the advice of a professional man, who is at present engaged in connection with the site formerly occupied by Cremorne Gardens, has been sought. A conditional contract for the purchase of the land has been formed, and a syndicate of capitalists is to be formed to acquire it and transfer it—at a profit, of course—to a joint-stock company, who are to undertake the erection of the new co-operative town.

The ordinary fortnightly meeting of the Liverpool Engineering Society was held on Wednesday evening. The Hon. Sec., Mr. W. W. Squire, read a paper on "Stone Masonry." The paper commenced with a description of building stones and their characteristics, durability, and strength. The result of some experiments on red sandstone from the neighbourhood of Liverpool was given, which showed that this stone required a load of 2·5 tons per square inch to crush it. After describing the manner of building heavy masses of masonry and lighter ashlar work, the author went on to the dressing of stone, and the tools employed by stone-dressers and masons, concluding his remarks with some reference to the plant necessary for carrying out masonry structures.

The Thames Conservancy and the Metropolitan Board of Works are at loggerheads. A letter from the Thames Conservancy Board was read at the last meeting of the Metropolitan Board upon the condition of the Thames, enclosing replies from Capt. Calver, Capt. Burstal, R.N., and Mr. Leach, the engineer, to the reports of Sir Joseph Bazalgette and others. The gist of these replies is that the Conservators see no ground to alter their opinion that the deposits going on at the outfalls are dangerous and obstructive, and they call upon the Board of Works to dredge them away, and to adopt such measures as will prevent the formation of any deposits for the future. It is quite clear some measures will have to be taken to abate the deposit, and as to the origin of the shoals there can be little question. The Metropolitan Board have, in reply, asked for plans and sections, showing the position and configuration of these banks, but such a request seems to us like asking for drawings showing the masses and contour of vapour in the atmosphere.

The opening meeting of the session for 1878-9 of the Royal Institute of British Architects will take place on Monday, the 18th prox., when an inaugural address will be delivered by the president, Mr. Chas. Barry, F.S.A. We understand that promises have been received by the council of 17 or 18 contributions of papers, the first of which will be read on Dec. 2nd. The award of prizes will take place on March 10th, 1879, the annual general meeting on May 5th, and the presentation of royal gold medal and distribution of prizes at the closing meeting on June 23rd. We cannot give further particulars at present, as no list of titles of papers and their readers is issued by the Institute this autumn. The session of the Architectural Association will be opened this (Friday) evening by a conversazione at Conduit-street, W.

CHIPS.

Ickford-bridge, crossing the Thames at Watterstock, is in course of reconstruction for the Oxon and Bucks county magistrates; Mr. George Castle, of Oxford, has taken the contract at £562. In Oxfordshire, the contracts for repairing bridges at Chesterton, Wrenchwick, Fringford Mill, and Stoke Lynewood, have all been taken by Messrs. Grimsley, builders, of Bicester.

The Plumstead District Board of Works on Wednesday week concluded a contract with Messrs. John Mowlem and Co., for executing all works of paving and crossings in the district on schedule scale of prices. Plans for a new church of St. Mildred, at Lee, were passed on condition that proper provision be made for the covering in or diversion of a water-course which crosses the site.

On the 10th inst. memorial stones were laid of a new Baptist chapel at Haverfordwest. Mr. W. Morgan, of Carmarthen, is the architect, and Messrs. Morgan and Thomas, of Haverfordwest, the contractors.

The new county hall at Denbigh was occupied for the first time by the Denbighshire magistrates on Thursday. It forms a part of the old militia barracks, and has been altered in accordance with plans prepared by Mr. E. Lloyd Williams, the county surveyor.

Dagenham parish church, South Essex, was re-opened on Thursday week, after thorough restoration from the designs of Mr. Ernest G. Lee. The old box-like pews have been replaced by seating, providing increased accommodation, an unsightly north gallery removed, the nave floor lower, and other works executed. The builder was Mr. J. S. Hammond, of Romford.

New premises for the branch of the Stourbridge and Kidderminster Bank, at Moreton-in-the-Marsh, were recently opened. The fittings are of mahogany and Riga oak, and the paving of encaustic tiles. Mr. J. S. Meredith, of Kidderminster, is the architect, and Mr. Tombs, of Campden, the contractor.

On Tuesday, the 15th instant, the private chapel at Ashe Hall, Richmond, Yorkshire, which has been erected for the Earl of Zetland, from designs prepared by Mr. T. Oliver, architect, of Newcastle-on-Tyne, was opened.

CHAPPUIS' PATENTS

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OF EVERY DESCRIPTION, ALSO

ARTIFICIAL LIGHT REFLECTORS.

P. E. CHAPPUIS, Patentee. Factory, 69, Fleet-street, London, E.C.

N.B.—DIAGRAMS AND PROSPECTUSES ON APPLICATION.

The parish church of Midsomer Norton was re-opened on the 17th inst., after restoration at a cost of £2700, from the designs of the late Mr. Gane. Mr. Vallis, of Frome, was the contractor.

NOTICE OF REMOVAL.

CHUBB AND SON,
LOCK, SAFE, AND IRON DOOR MAKERS,
Have REMOVED their SAFE and LOCK BUSINESS to new and extensive Premises,
128, QUEEN VICTORIA STREET, ST. PAUL'S, E.C.
Illustrated Price Lists gratis and post-free.
Makers to the QUEEN, H.R.H. the PRINCE OF WALES, and the Bank of England.

STAINED GLASS.

SANDRINGHAM.—A painted window has been inserted in the north wall of the chancel of Sandringham Church in memory of the late Rev. W. L. Onslow, M.A., rector, at the expense of the Prince of Wales. The window is a single light, and the subject is Christ Stilling the Waves. On the south wall, within the communion rails, is a brass memory tablet. The next window has been filled with glass of similar character in memory of the Prince's late equerry, Col. Grey, the subject in this case being David Slaying Goliath. The structural alterations to the chancel have been carried out under the superintendence of Mr. Blomfield.

LANCASTER'S KILNS
FOR BURNING BRICKS, &c.,
(Patented in England, France, and Germany),
Effect a Great Saving in Charging and Discharging, and 50 per cent. of Fuel.
Apply to ROBERT LANCASTER, Leeds Brickmaking Company (Limited), Armley, Leeds.

VERITY'S AIR-PROPELLER.

IT is quite beyond doubt that there are many times when if a constant supply of fresh air be necessary it must be pumped in—it will not come in of itself—and there are places where it can never be obtained without some artificial action. Messrs. Verity Brothers have patented an arrangement to effect this, which is simple and effective. It somewhat resembles in appearance an ordinary gas-meter, and occupies but small space. A cistern placed in the highest available position in the building in which the apparatus is to be used, and a ¼in. lead pipe conveying the water to the machine, are all that is required. The internal mechanism consists of a drum, with a set of fans worked by a fly-wheel placed in the centre and on the same axis as the fans, which revolves on jewelled centres. Two mere pin-hole jets of water directed on to the fly-wheel put these fans in rapid motion. A current of air may be passed through the machine at the rate of 1,000ft. per minute and upwards, according to the size of the apparatus; reducing the supply of water by turning the tap, the revolutions may be brought down to three or four per minute, so that the current of air may be regulated to the nicest degree. A couple of machines, placed in proper position and nicely regulated, secure the result of an incoming current of the exact force required, and no more, and an extracting power equal to, or greater than, the inlet supply. The water, after working the machine, passes down through minute orifices across the inlet tube, and thus washes the incoming air. The invention is applicable to many wants, and ought at once to come largely into use.—Vide *Builder*, Aug. 3, 1878.

VERITY BROTHERS, Patentees and Manufacturers of Ventilating and Sanitary Appliances, 127, Regent-street, W.; Works, 155, Queen's-road, Bayswater, W. [ADVT.

HELLIWELL'S
Patent New System of
AIR AND WATER-TIGHT
IMPERISHABLE GLAZING.

All woodwork is covered, and no outside painting is required. Old Roofs re-glazed. Any one can repair or take in pieces.

EXTRACTS FROM THE FOLLOWING PAPERS:—
"It is suitable for Railway Stations, Mills, Weaving Sheds, &c., but is specially applicable to Conservatories, Plant Houses, and Orchard Houses, and we should be very much inclined to try the system. It is certainly worth looking to."—*The Builder.*
"And will, in our opinion, supersede any other similar system before the public."—BUILDING NEWS.
"It seems to meet the end in view more nearly than anything we have seen yet."—*The Field.*
"The patent has given high satisfaction to every one using it."—*The Christian Union.*
"Convincingly prove the new Glazing System to be worthy the attention of readers of the Keystone."—*The Keystone.*

For Estimates, Drawings, or particulars, apply to the Patentee,
T. W. HELLIWELL,
BRIGHOUSE, YORKSHIRE; OR,
19, PARLIAMENT STREET, LONDON.

Trade News.

WAGES MOVEMENT.

KIRKCALDY.—The operative masons in the Kirkcaldy district have been informed by their employers that their wages would be reduced 1d. per hour, but on a deputation of the men waiting upon the masters on Friday last, and offering to submit to a reduction of ½d. per hour, the compromise was accepted.

HADDINGTON.—The masons employed at the Knox Memorial Institute, Haddington, have struck work in consequence of a proposed reduction in the wages of from 8d. to 7d. per hour. The men offered, until the impending dispute in Edinburgh was settled, to take 7½d. per hour, and to abide by the settlement arrived at in Edinburgh, but this was declined.

EDINBURGH.—On Saturday the operative masons of Edinburgh, to the number of several hundreds, who stopped work on the previous evening in consequence of the intimation of a reduction of 1d. per hour in the rate of wages, attended at the society's hall, in High-street, and had their names entered on the "strike roll." The reduction of wages and the abolition of bye-laws notified by the Edinburgh and Leith Builders' Association do not take effect until to-day. — At a crowded meeting of the operative masons of Edinburgh, held on Wednesday night, it was all but unanimously agreed to submit to a reduction of ½d. per hour on the present rate of wages, provided the Master Builders' Association continued as hitherto to recognise the bye-laws of the operatives as to the customary weekly warning and shedding accommodation for builders during wet weather, &c.

CARLISLE.—The Carlisle masons who have been on strike have resumed work on the old terms until Martinmas, when the work will be done at 8d. per hour—the week being 51½ hours in summer and 47 hours in winter. The masters have formed a determination that the bricklayers should be put upon the same terms, both as to pay and time.

WHITLAND ABBEY GREEN SLATES.

These SLATES are of a grey-green tint, are stout, and made in all sizes. A large stock available for immediate delivery. For further particulars (with a list of important buildings covered) apply to the MANAGER, Cynderwen, S.S.O., Carmarthenshire.—[ADVT.]

HIGH-CLASS VARNISHES.

READE BROTHERS, Tower Varnish Works, Wolverhampton, respectfully invite attention to their Varnishes for House Painters, Decorators, and Builders, which will be found of uniform excellence, and for elasticity, insure, and durability all that can be desired. They would direct special attention to their Extra Hard-Drying Varnishes for church seats, and seats of schools and public buildings, which for hard-drying, brilliancy, and wear are unsurpassed.

TENDERS.

BETHNAL GREEN.—For the erection of schoolkeeper's house in front of the Board School in Teesdale-street, Bethnal Green, for the London School Board. Mr. E. R. Robson, architect:—

Jerrard, S. J., of Lewisham (accepted)	£465

CANNOCK.—For the construction of a bridge, retaining walls, &c., for the Cannock Old Coppice Colliery Company, Limited. Messrs. T. C. and F. P. Sharp, engineers:

Barton	£3,850
Moss	2,951
Cooper	2,818
Bell	2,650
Lovatt	2,500
Horseman and Co.	2,400
Wilson	2,349
Hartley (accepted)	2,189

GREENWICH.—For hot water apparatus in the workhouse infirmary for the Greenwich Board of Guardians:—

Greenaway, Greenwich	£62
Mott, Deptford (accepted)	58

GUILDFORD.—For small detached house, Cooper-road, Guildford. Mr. Henry Peak, architect; quantities not supplied:—

Swayne, Thomas (accepted)	£310

HAMMERSMITH.—For alterations and additions, new board-room, &c., at Broadway House, Hammersmith, for the Fulham District Board of Works. Mr. Alfred C. Bean, surveyor to the Board, architect; quantities supplied:—

New building.	Alteration to old building.	Gross estimate.	Allow on old material.	Nett estimate.
		Eyles, S.:		
£5,700 0 0	£1,780 0 0	£7,480 0 0	—	£7,480 0 0
		Pickersgill:		
5,751 9 0	1,570 11 0	7,322 0 0	—	7,322 0 0
		Braid and Co.:		
5,300 0 0	1,700 0 0	7,000 0 0	—	7,000 0 0
		Crockett:		
5,443 0 0	1,612 0 0	7,055 0 0	£55	7,000 0 0
		Lathey Bros.:		
4,970 0 0	1,796 0 0	6,766 0 0	60	6,706 0 0
		Mears:		
——	——	6,500 0 0	70	6,430 0 0
		Parkinson:		
4,903 18 1	1,515 8 11	6,424 7 0	25	6,399 7 0
		Brealy:		
5,045 0 0	1,350 0 0	6,395 0 0	45	6,350 0 0
		Jones and Co.:		
4,990 0 0	1,396 0 0	6,386 0 0	105	6,281 0 0
		Parker and Evans:		
4,735 0 0	1,353 0 0	6,088 0 0	48	6,040 0 0
		Beale:		
4,950 0 0	1,205 0 0	6,155 0 0	128	6,027 0 0
		Wagner:		
4,750 0 0	1,240 0 0	5,990 0 0	100	5,890 0 0
		Scott:		
4,433 0 0	1,288 0 0	5,721 0 0	50	5,671 0 0
		Architect's estimate:		
4,891 0 0	1,330 0 0	6,221 0 0	60	6,161 0 0

KILBURN.—For the erection of four detached villas in Canfield-road for Thomas Yeo, Esq. Mr. Banister Fletcher, architect:—

Whiteman (accepted)	£5,280

ZINC ROOFING
FIXED COMPLETE.
F. BRABY & CO.,
THE MANUFACTURING AGENTS OF THE VIEILLE MONTAGNE CO.
PATENT SOLID UNSOLDERED RIDGE PLATES,
FOR ITALIAN OR PLAIN ZINC ROOFING.
BY THE ADOPTION OF THIS METHOD THE USE OF SOLDER IS ENTIRELY DISPENSED WITH AND CONSEQUENTLY THE DANGER INCURRED BY THE USE OF FIRE-POTS IS AVOIDED.
FITZROY WORKS, EUSTON ROAD, LONDON. ALSO AT DEPTFORD, LIVERPOOL, GLASGOW, AND CYPRUS.
ESTIMATES FOR ZINC DORMERS, FLATS, &c.

THE BUILDING NEWS.

LONDON, FRIDAY, NOVEMBER 1, 1878.

THE LAST DAYS OF THE PARIS EXHIBITION.

THE time is near at hand when the packing cases will again invade the trim and orderly galleries of the Exhibition building, and when all will be turned into dust, noise, and confusion. We may, however, before this take a last look round the English department, and note how some of the chief medals and prizes have been distributed. The numbers of awards to foreign countries appear to exceed very considerably those in the last great exhibition at Paris; we think, at a rough estimate, the totals must reach 50 per cent. more than in 1867. Of course it is impossible that every one should be satisfied, nor could we hope that even an international jury would prove infallible. We have no intention, however, of sitting in judgment upon the verdict of the jury, but propose in our present observations to notice what has principally appeared worthy of reward in some of those classes in the industrial section in which our readers are likely to be more especially interested. There can be but little doubt that had not Mr. Waterhouse already, in 1867, carried off the highest honours in architecture, he would again, on this occasion, have received the medal of honour. This, however, by the rules was not possible, but he takes of right a "rappel," or record of a former medal, which causes him to head the list of the English architects again in 1878. The two first medals—carried off by Messrs. Street and Pearson—will make up to Gothic men for the loss of the medal of honour, which goes to Mr. E. M. Barry, whose brother was the juror in this class.

Passing on to Group 3—"Furniture and its Accessories"—we find that the firm which has made the greatest effort and the most lavish display has declared itself "hors concours," one of its members having served on the jury. Messrs. Gillow and Co. certainly deserve the highest praise for the collective exhibition which they have brought together in the Prince of Wales's pavilion; we have not seen anywhere else in the Exhibition a display of similar importance by a single firm. The only grand prize in this class, or rather in classes 17 and 18 united, goes to Messrs. Jackson and Graham, of Oxford-street. Messrs. George Trollope and Sons, whose dining-room in pencil-cedar has been so greatly admired, carry off one of the gold medals. The apartment they have sent to Paris is in the fashionable style of the Queen Anne period, though wholly free from the glaring eccentricities and the abuse of the five orders, which is too often characteristic of modern Queen Anne work. The panels in painted tapestry which surround the room illustrate passages from the "Rape of the Lock." Over the elaborately carved chimney-piece is a niche containing an excellent bust of Pope. A mirror frame in carved limewood, and some furniture in citron-wood are also singled out for special praise by the jury. A second gold medal goes to a Manchester cabinet-maker—Mr. James Lamb. His principal work is a well-designed oak sideboard, but we fail to find the reason for the preference shown by the jury for some of the other objects enumerated. Messrs. Collinson and Lock, who have made great exertions to represent themselves thoroughly at Paris, have also received a gold medal. Their house in the central avenue, designed by Mr. Collcutt, which we have already illustrated, is filled with charming old English furniture, and they have also a large display of cabinet work in the main building. We cannot avoid being struck with the extent to which they have availed themselves of blue and white Oriental china, which serves as an admirable foil to their furniture and decorations. The house they have built, and the whole of the goods they have exhibited therein, have been bought by Baroness James de Rothschild.

English exhibitors have indeed little cause to complain of a want of appreciation for their works in Paris, for it is surprising to find how much of the china, the glass, and the furniture has been purchased by French amateurs. A gold medal is gained also by Messrs. George Jackson and Sons for their *carton pierre* decorations in the Prince of Wales's pavilion. A rappel of a gold medal awarded to Messrs. R. W. Winfield and Co., of Birmingham, for the excellence of the workmanship of their works in brass and other metals, appears to complete the list of the medals of the highest class. Another firm of metal workers—Messrs. Mark Feetham and Co.—have received a silver medal; and a foremost place among the silver medal lists must be conceded to Messrs. James Shoolbred and Co., of Tottenham Court-road. In some respects we think the furniture of this firm surpasses that of all the other English makers. It is admirably designed by Mr. W. H. Batley, and is shown partly in the house in the central avenue, to which a façade is contributed by Messrs. Doulton and Co., and partly in three rooms in the industrial section. The room on the ground floor of Doulton's house is fitted as a lady's boudoir in the old English style, with satin-wood furniture, panelled silk walls, and draperies in embroidered satin. The upper room is arranged as a business office or a board-room for a public company. The three rooms within the building are fitted up respectively as a library, a dining-room, and a bedroom, and in point of design and execution leave little to be desired. Messrs. Holland and Sons have a silver medal for a very graceful suite of bedroom furniture in satin-wood, richly ornamented with marquetry inlays in the style of the Adams period. The rosewood cabinet exhibited by Messrs. H. Ogden and Son, of Manchester, executed from drawings by Mr. Batley, and an elaborate piano case, to which we drew attention last week, have gained for this firm a silver medal. A like distinction is awarded to Messrs. C. Mellier and Co., who show some excellent furniture in buhl, of the Louis XIV. and Louis XVI. periods. The only other recipients of silver medals for furniture are Messrs. Howard and Sons, who contribute an oak dining-room of the Jacobean period, some excellent specimens of their parquetry work, and some good metal work. Nearly fifty bronze medals and honourable mentions have been distributed among the remaining exhibitors. We should here mention that Messrs. W. B. Simpson and Son have a silver medal in this class for art tiles. Mr. John Ward receives one for automatic chairs for invalids, and Messrs. Peyton and Peyton a like distinction for their bedsteads. Mr. Montague Guest was the juror in Class 17, and Mr. J. H. Donaldson (of Messrs. Gillow and Co.) in Class 18.

Crystal, glass, and stained glass are all included together in Class 19: and here we find the grand prix has been carried off by Messrs. T. Webb and Sons, of Stourbridge. A gold medal has been gained by Messrs. Camm Bros., of Birmingham, for their stained-glass windows, which are included, under the French system of classification, with table-glass and glass bottles. To the latter class of goods no less than three silver medals have been adjudged—namely, to Messrs. Kilner Bros., to the Aire and Calder Bottle Co., and to Messrs. Bagley, Wild, and Co. Messrs. Hodgetts, Richardson, and Co. take a silver medal, and they deserve great credit for the excellence of their glass cameos, which are produced by coating over a dark ground with a thin covering of white glass. This is cut through either wholly or in part, leaving a subject in low relief on the darker ground. In this way they have reproduced the famous Portland vase in the material in which it was originally executed. They show also some interesting specimens of "threaded glass"—in which spiral threads of variously-coloured glass are wound round vessels of clear glass—and some very good examples of well-executed engraving. Messrs. James Powell and Son have also obtained a silver medal for an admirable display of glass, more especially to be commended on account of the excellence of its forms and the artistic skill evinced in the designs. The opal glass is a speciality with this firm, and their imitations of the old Venetian glass are also first-rate. Four silver medals have been awarded to the stained glass—to Messrs. Lavers, Barraud, and Westlake, Messrs. W. B. Simpson and Sons, Messrs. Ward and Hughes, and Messrs. Powell. A rappel of a silver medal is also due to Messrs. Hardman and Co., of Birmingham. About a dozen bronze medals and honourable mentions are shared among the remaining exhibitors. We think that among the minor prize-winners especial reference should be made to the display of Mr. A. Jenkinson, of Edinburgh, whose gossamer-like "muslin glass" and high-class engraved work has gained for him a bronze medal. A similar medal is secured by the Aurora Glass Company, who have succeeded in imbedding in their glass thin leaves of gold, silver, and platinum in such a way as to produce very beautiful effects of powdered gold and other metals in the blown glass. Mr. Foster Graham (of Messrs. Jackson and Graham) acted as the English juror in this class.

Pottery, which follows glass in the French classification, is a product in which the English section is especially strong. Here again the grand prix follows the highest reputation, and Messrs. Mintons, of Stoke-on-Trent, whose firm has certainly more than any other made our English pottery what it is, secure the coveted distinction. In a set of show-cases, or rather a court of quaint design and singular colour—which has been, we believe, carried out in accordance with drawings by Mr. Norman Shaw—Messrs. Minton have made a princely show of porcelain, pottery, and majolica ware. Their pâte-sur-pâte work rivals in delicacy and refinement some of the best specimens of Sèvres, and some of their large decorative vases are unsurpassed in the Exhibition. We do not think, however, that this firm has made so much progress, or has produced so many examples in which real excellence is combined with novelty, as is evinced by the works of the famous factory at Worcester under the direction of Mr. Binns. Their ivory ware in the Japanese taste, their reproductions of some of the old Worcester patterns, and their delicate porcelain are worthy of the highest commendation. They have received a gold medal and a like reward is obtained by Messrs. J. Wedgwood and Sons, who are able by a constant succession of admirable works of art to sustain a reputation which has now been enjoyed for upwards of a century. The old firm of Brown, Westhead, Moore, and Co., who enjoy the foremost position as manufacturers of earthenware and majolica, have also been awarded a gold medal. Messrs. Copeland, who scarcely exerted themselves so much as many rivals of infinitely less renown, bear away a rappel of a gold medal; perhaps they are content to rest upon their laurels. Among those English manufacturers whose objects appear to have possessed for the jury the highest interest, on account both of their artistic excellence and their novelty, a foremost place

must be given to Messrs. Doulton and Co. for their "Doulton ware" and "Lambeth faïence." They have secured for this a gold medal, and Mr. G. Tinworth, their artist, has also been specially commended. The two most prominent exhibitors of encaustic and decorated tiles—Messrs. Minton, Hollins, and Co., of Stoke, and Messrs. Maw and Co., of Brosely—each receive a silver medal. The only other silver medal has been awarded to Messrs. Pinder, Bourne, and Co., of Burslem. More than a dozen bronze medals and honourable mentions fall to the share of the remaining manufacturers of pottery. The exhibitors in this class have had the advantage of the able services of Mr. A. W. Franks, of the British Museum, as juror.

Carpets, tapestry, and other stuffs for furniture, comprised under Class 21, must have given the jury much trouble to find, for the objects in this section, owing to the great deficiency in wall space, have been distributed in all parts of the industrial galleries. In point of absolute novelty, as far as England is concerned, the place of honour must be conceded to the tapestry works at Windsor, in which was produced the excellent set of hangings which surround the dining-room in the Prince of Wales's pavilion. This set of tapestries, which illustrates very appropriately passages from the "Merry Wives of Windsor," was designed by Mr. Hay, of the firm of Gillow and Co. The Royal Windsor Tapestry Company have received a gold medal, the highest award to England in this class. Gold medals have also been gained by Messrs. Thom and Lawson, of Newgate-street, and Messrs. H. and M. Southwell, for the excellence of their carpets. Rappels of gold medals are adjudicated both to Messrs. J. Brinton and Co., and Messrs. J. Templeton and Co., who have supplied the carpets in the Prince of Wales's pavilion and the office of the Royal Commissioners. Rappels of silver medals are set down to Messrs. Willis and Co., Messrs. Henderson and Co., Messrs. M. Nairn and Co., and Messrs. Lapworth Brothers. Six other carpet manufacturers—Messrs. Cooke, Sons, and Co., Messrs. Grimmond and Co., Messrs. Turberville, Smith, and Co., Messrs. Tomkinson and Adam, Messrs. H. Widnell and Co., and Messrs. Woodward, Grosvenor, and Co.—likewise obtain silver medals; as do also Mr. F. Walton for floor-cloth in imitation of Russia leather, and Messrs. Barbour and Miller for stuffs for furniture. Nine other firms have received either bronze medals or honourable mention. Our English juror for carpets was Mr. Vincent Robinson, whose tastes, one would think, would lead him to incline to Oriental fabrics and designs. We must leave until next week the consideration of some of the remaining awards.

THE SOCIAL SCIENCE CONGRESS.

THE Social Science Congress commenced last week at Cheltenham, and closed on Tuesday, can hardly be said to have been a success this year. The subjects discussed and the papers read do not bear comparison with those of previous gatherings (although that is not saying very much for the latter), and the few strong addresses and papers seem lost amid a profusion of weak ones. We shall confine ourselves to a brief review of some of the salient points in the papers and discussions bearing upon sanitary, economical, and art questions. The Health Department was certainly one of the most important, and Dr. W. Hardwicke's paper on "Complete Disinfection, and the Best Means of Providing for it by Sanitary Authorities" dwelt in a comprehensive manner with one of the most pressing topics of sanitary interest. Dr. Hardwicke's paper contended for a compulsory rather than for permissive legislation, and the chief conclusions of his argument were: first, that sanitary authorities should procure returns by which a knowledge of the state and the origin of epidemics might be insured by a compulsory notice and registration; secondly, the compulsory isolation or removal of patients by the authorities, and the disinfection of their rooms and clothes, better accommodation for the pauper class; thirdly, the provision of a public disinfecting establishment under the management of the sanitary staff of the town. Dr. Hardwicke described a model disinfecting establishment. Dr. Francis Bond, of Gloucester, proposed other legislative measures—such as compulsory notification of any case of infectious disease to the occupier of premises in which it exists, and a similar notification by occupier to the sanitary authority, power on the part of authority to enforce isolation, and on the part of householder to provide means of isolation at the charge of the said authority. Dr. Child, of Oxford, Mr. Edwin Chadwick, C.B., Dr. Farr, and others, spoke also upon the subject; and Dr. Heaton and Dr. Farr thought that, although treatment at the hospital may be desirable for the public, it was often prejudicial and fatal to the patient himself, and the chances of recovery were diminished by removal to hospitals, where the poison was concentrated and intensified. Dr. Alfred Hill (Birmingham) spoke generally upon house sanitation and highly rated architects; but the most important paper of this section last Friday was that by Mr. F. W. Waller, architect, Gloucester, upon the "Sanitary Condition of Houses." Mr. Waller's suggestions were directed mainly towards the improvement of existing houses by means which an intelligent workman may accomplish without aid. An adequate supply of air by Sheringham's inlets, Tobin's tubes, louvres, air-chambered grates, or by admitting air at the meeting rails of sashes in a manner we have before called attention to, was insisted upon, and the removal of vitiated air by flues near some constant source of heat, such as the kitchen chimney, or otherwise. One idea is to make a flue in chimney-breast open at ceiling, and at the bottom under the grate, the heat of the fire drawing the foul air down when it passes up the chimney. One of Barnard and Bishop's grates we have before commended in our pages, called the Parson's grate, shallow in depth, and with a fire-brick bottom, is advocated by the author, who also suggested that the kitchen range might be made more useful as a source of warmth. We cannot enter into other details advocated, such as disconnection of house drains, open ends, ventilating lobby between house and offices, inspection holes in lines of drains, a plan of all drains and flues for reference, and burnt marks upon all wood-work concealing pipes, &c. Mr. Waller well remarked upon the neglect of labour-saving appliances in houses, such as hot and cold water services, hoists, speaking tubes, warming apparatus, &c.; a central motive power for mechanical work was hinted. As Mr. Waller said, the house-designing of the future has a vast field before it, but it is not possible, by copying archæological and quaint devices, to produce satisfactory modern dwellings. We may only add that Mr. Collins, of London, defended architects from the charges made by Dr. Hill, and said that they were not responsible for all the defects in house-building, and that in the worst cases it would be found no architect had been employed. We think the public are as much to blame if not more for a neglect of sanitary precautions, and the profession are too willing to comply with their ideas instead of *leading* in matters of this kind. "Neglect in Sanitary Matters" was the title of a paper by Mr. H. Robinson, C.E., which pointed to many of the shortcomings of sanitary law, and the neglect of vestries, and will be read with interest by all having the reform of the sanitary condition of large towns at heart. Mr. Robinson cited cases of blundering and defects in the connection of sewers that fairly appal us, such as two sewers of 6ft. diameter entering an old one of only 5ft., resulting in accumulation at point of junction, and the infection of houses with sewer gas. Mr. Robinson, in short, told a pitiable tale of the bad working of the vestries of London, and urged the necessity of superseding these authorities in health matters by an organised health department with compulsory powers; other speakers commented upon the defective state of legislation, and the necessity of compulsory powers to bring about reform in house construction, the arguments for which are unnecessary to repeat here. The discussion, however, proved the apathy of the public, the inertia of local authorities, and the need of a central controlling authority to enforce action or the necessity of more power being given to local authorities. House inspection was strongly recommended.

A suggestive paper was read by Dr. Wilson, on "A Circular System of Hospital Wards." Mr. Marshall, the author of the paper, urged that the circular plan insured all the conditions of exposure to light and air, wall and floor space to each bed, ventilation and warming, isolation, and the separation of the administrative from the sick departments. Capt. Douglas Galton and Dr. Hill disapproved of the circular system as not being so favourable to lighting and natural ventilation as the oblong ward; and the general gist of the discussion was adverse to the principle suggested by Mr. Marshall. We have no space to allude to an interesting paper by Dr. G. W. Child on the "Working of the Public Health Acts of 1865 and 1872," in which the writer showed the failure of the Acts, and that the results were wholly incommensurate with the expense incurred, and that the Metropolitan Board of Works and the vestries are quite powerless to cope with house sanitation.

Referring very briefly to the address by Mr. W. H. Michael, Q.C., President of the Health Department; we can only glance at some important points. Mr. Michael looked for an amended and consolidated code for the Metropolis—general uniformity in the law as regards building, drainage, ventilation of houses; the establishment of a ministry of health, and a central authority to control local action, instead of the disjointed authorities spread over the Government Departments, the Local Government Board, Board of Trade, Registrar-General, and Home Office. We quote a part of Mr. Michael's address bearing upon the rearrangement of sanitary districts:—

A reconstitution of the boundaries of districts within which sanitary authorities exercise control is the first requisite to insure a thorough amendment of the public health. What is most urgently wanted is the appointment of a small commission to inquire into and report to the Government upon the boundaries and conditions of the various districts in England and Wales, and to recommend such readjustment as would allow the whole country, when subdivided according to local exigencies and position, to be governed by uniform sanitary laws. This would entail a further change of equal importance, and, it is believed, of even greater utility—the reconstitution of local authorities. We have town councils, local boards of health, improvement, drainage, and other commissions, boards of guardians, highway boards, burial boards, vestries, and the like, all discharging functions closely akin to each other, with various staffs of officers, with different officers collecting different rates, and often clashing in the functions discharged and the jurisdiction exercised. To amalgamate these into one body, discharging all functions of municipal government within the newly-constituted districts would be to constitute a local parliament of the first instance of high importance, which would attach to itself the best ability and highest character of the district, and would not only by its efficiency, but also by the economy resulting from an amalgamation of duties

officials, and offices, produce an amount of good which under our present system or want of system is quite unattainable.

In the economic section Mr. James S. Randall read a paper dealing with the means to be adopted to enable and induce the wage-earning classes to secure for themselves a due provision for sickness and old age. We need hardly say we heartily commend some of Mr. Randall's suggestions, such as a secure national insurance on a co-operative principle, upon the basis of the Post-office Savings Bank, for the relief of the wage classes. We have no space to follow Mr. Randall in his lengthy statistics and attack of friendly societies, nor the advantages to be derived from an organisation for the working classes; but we believe provident habits would be fostered by an organised effort in this direction applicable to the whole kingdom.

In the Department of Art the questions raised were few. Lord Norton, in his opening address, made some judicious observations, claiming for art a kind of link between utility and convenience and the refining influence of beauty. The errors of architects and manufacturers, who have been seeking beauty abstractedly from their use and purpose, and have been borrowing incongruous features from other conceptions, were exposed. In speaking of the honest expression of art-purpose, Lord Norton referred to the common error of regarding art as a counterfeiting of purpose in making things look like something different—as in making an engine-house like a church, a smoke shaft like a campanile, or a pair of tongs like a Gothic arch, and with this idea to conceal features which properly belong to the design. "It is thought a beauty," he said, "to make china look like gold or bronze, and imitations, such as wall-paper, like embossed leather. This is jugglery, not art; or certainly not art giving beauty to utility." We quote one sentence that bears upon artistic hypocrisy. "To make a building commend itself to the eye as admirably suited to its purpose, to depend for beauty on proportion, to dare to leave large breadth of space unadorned in reliance on its fitness speaking for itself; to eschew unmeaning features, sham windows, and superfluous detail; to imitate nature in truth and in appropriate effect; to embellish forms without a masquerade of colours—as a savage tattooing his skin—such are true aims for art, taking beauty as its ingredient, and not as an adjunct." The author strongly insists upon the union of utility with beauty in all works, and quotes Mr. Gladstone's pregnant passage, in which it is asserted that "Beauty is not an accident of things; it pertains to their essence."

Mr. Statham's paper on "Economical Street Architecture" referred to a question that has been discussed in our pages too often to need reiteration. The paper recommended the use of concrete as an admirable vehicle for surface decoration, and suggested that our town architecture should be enlivened with some reminiscence of the life of nature. Rust's mosaics, Doulton's moulded and stamped terra-cotta coloured tiles, and other means of enrichment were proposed. Concrete lintel instead of flat arches are recommended as more capable of decorative treatment. As regards cost, Mr. Statham's calculations will scarcely be borne out by the experience of the practical builder. He says a saving of about one-third or more can be effected by its use instead of brickwork, and that a saving of about £100 upon a small street house may be counted on. Our experience in concrete hardly justifies these assertions. We need hardly remark that the author has much to say against the cut-brick festoons and other features of the Queen Anne style, Mr. Lascelles's cement slab designs, and other imitations of older styles. We cannot quite understand what the landscape painter's ideal of decoration would be, or quite how the life and colour of nature can be brought to enliven our dull streets. No one can doubt that the "pattern book" and mechanical decorations have done all the mischief, and we have repeatedly urged the use of such ornamentation as can be produced by simple stamped or sgraffito means. The discussion upon this subject showed the very vague and superficial ideas prevalent about concrete construction.

Mr. Skipworth's paper on "Some Neglected Principles of Decorative Art in Ecclesiastical Architecture" dwelt upon the disregard of first principles in our churches and houses, and the "Queen Anne" revival came in for severe condemnation. Mr. Skipworth's suggestions—good as they were—did not advance anything new, one of the most important of the suggestions made being the decoration of our ceilings, and the employment of colour in them. The remarks made upon stained glass were a reiteration of principles that are superfluous but for the revival recently sought to be introduced of sixteenth century art.

A paper "On the desirability of obtaining a theatre not wholly controlled by prevailing popular taste," by Mr. G. Godwin, F.R.S., suggested a State subvention on the plan adopted in connection with the Exhibition of 1851. Our experience of State interference in these and similar matters has left us with the conviction that the adoption of such a proposition would have the contrary effect, and would rather tend to check dramatic art. We question altogether the practicability of the proposal, or the probability of any improvement in the tone of the drama, such as the author of the paper held out. The undraped figure was the theme of a paper read by Mr. P. H. Rathbone, of Liverpool. The propriety of making the nude a study in art is by no means a new question. Mr. Rathbone comes forward really to combat an over-prurient class of the public in Liverpool, which has thought it right to publicly protest against the exhibition in that town of Mr. Alma Tadema's picture of "The Sculptor's Model," well-known to most of our readers as one of the Academy subjects this year. We are not desirous of discussing whether the "unclean Turk" was really by his polluting presence the origin of the absurd objection to the nude, as contended by Mr. Rathbone, though in all probability he considerably helped to lower the standard of European morality, but we quite agree with the author in thinking that this unhealthy objection to the undraped figure arose from that mock modesty and unnecessary concealment of the nude; that, in fact, "prurient curiosity was bred of prudish concealment." Mr. Rathbone alluded to Early Christian art, to the nude representation of Isaiah in the catacombs, to the Greek artists who always exhibited the complete representation of the human form, and to Michael Angelo's satirical representation of an immoral-minded objector, who was shown in the depth of hell, with the serpent—the symbol of sensual corruption—coiled round his body. The speaker, referring to the prejudice, said it was shared by pure-minded and honest, if somewhat uneducated, people; and maintained that it was necessary for the future of English art and morality that the right of the nude figure to a place in our galleries be boldly asserted; but it must be nude as represented by trained artists only. Mr. Rathbone justly remarked upon the value of a study of the human figure, male and female, as the type of all beauty of form and proportion. To women the ideal female form was necessary in order to detect deviations in figure and dress, and to its neglect he attributed the distortions of tight-lacing, and the scandalous dresses of society and the stage. The modern high-heeled boot and its ill effects were due also to the ignorance of the study. Mr. Rathbone made out a good case, and his plea, while it may displease if not disguest "offended fathers, sisters, and grandmothers," some of whose letters are described as betraying a "foul-mindedness perfectly horrible," will strike a blow against the mock modesty of modern English society. Mr. Gambier Parry's opening address last Tuesday on "The Relation of Fine Art to Social Science," was a masterly disquisition. After dwelling upon the relationship between prose and poetry, romance and reality, Mr. Parry touched upon various points of interest. He said men's accessibility to fine art was as various as their individual characters, and few comprehended its highest flights. "If music or design failed to touch the power of the drama was irresistible." We had other things to attend to before art could become universal, and the author very aptly remarked that, "it was neither possible nor desirable that England should become an artistic nation." The pressure of necessity and political life had destroyed art, and since its wreck, three hundred years ago, the demand for art "came only from the wealthy few, and mainly for their vanity's sake." Among other things the author contended for a higher standard of life to raise our works of art which had too much the impress of domesticity upon it; he spoke of the need of handsome streets and squares in place of hideous brick hives; he counselled less niggardliness and selfishness; and censured strongly the striving after novelty and the plethora of models. He alluded in high terms to the effects of the art schools and museums, and concluded with a peroration upon the relation of art to ourselves. The following remarks are apropos:—

If people would only remember that they were social beings, with duties to their nation and their neighbours, they would repudiate selfishness of a niggardly parsimony outside their houses while indulgence reigned within, our national art would go forth fresh and free, and make our homes and cities a pride and pleasure to us all. Of all the vices which pollute the source and thwart the progress of fine art the striving after novelty was surely the worst. Originality was a dangerous talent; there was a good and bad side to it, as with many worse and better things. Original ideas were not got by looking for them. The influence of antiquity was inexpressible: it overruled all faults and excellencies. Two works done with equal poetry of soul and delicacy of hand would often bear no comparison, because time was in the balance. Originality might turn the whole river into a new channel, but it was only the channel that was new. If any nation had to begin its arts again it certainly was England. A few great names stood out like the tops of mountains above the mist, and cast a flood of glory on their age, but the public were dead to it.

Dr. Phené, F.S.A., followed with a paper on "The Humanising and Refining Influences of Art"—a continuation of a subject introduced by the author last year—being an historical résumé of classical art. The author treated first of the materials used by the Egyptians and Greeks—granite and white marble—and dwelt upon their symbolic significance, and the relation between art and religion. Granite was suitable to the sombre theology of Egypt, the Paros white marble to the brighter theism of Zeus and the Greek deities. The refinements of Egypt and Greece were antithetical. The general drift of the paper went to show the dependence of all Greek art upon the elevated and deiform conception of man, and we here give an abstract of Dr. Phené's concluding remarks:—

The most remarkable illustrations of the effect of art in influencing humanity, by producing refinement of feeling, was a negative one. Of course it was not assumed that art was the only agent in such results. Visible art was always found as a companion to the higher religions; with it polity, law, jurisprudence, rhetoric, which were all arts, were seen hand in hand with the sister arts of

literature, the drama, history, music, and science. It was, however, remarkable that the Hebrews, who had the highest form of religion, were inartistic; still they revered art, and as the Hebrew women borrowed jewels of silver and jewels of gold from the Egyptians, so their great king borrowed the artificers of Hiram in wood and metal work. The negative illustration was that of the followers of Islamism. Once highly artistic, all their art, together with their energy, was sapped by polygamy; but, degenerating as this was, it was nothing to their doctrine of women having no souls. By this women were taught that their animal passions were alone to be esteemed; there was no emulation even after worldly fame; the mind stagnated; the grand functions of the mother, the sister, the heroic and co-striving energies, endurances, courageous and encouraging features which characterised the betrothed maiden and honoured and honourable consort of other religions, were unknown. Art amongst them was now nowhere to be found. The high art of the Moors arose, and was sustained, from emulation with the art-workers of Christendom; that emulation once removed, no internal power remained. Similar evidences were drawn from other nations with whom polygamy was a custom. Emulation in attracting the admiration of a woman was a great inducement to the producers of art, while the study of beauty and perfection in artistic works was one of the most elevating and refining accomplishments of the fair sex.

We find it impossible even to allude to other papers read at the Congress in this résumé of the proceedings, but we have noticed all that are likely to be of interest to our readers.

THE USES AND ABUSES OF PORTLAND CEMENT.

But men may construe things after their fashion,
Clean from the purpose of the things themselves.

It is not intended in this paper to discuss the value and suitability of Portland cement in regard to engineering purposes, nor to formulate its cohesive strength and power of setting under varying circumstances, nor indeed to treat of it at all as, strictly speaking, a building material, but to offer some few suggestions which occur to us as to its architectural treatment, and consider those abuses to which, from its peculiar nature, it is especially liable. Portland cement is, as is well known, a comparatively modern invention (1843), and has until quite recently not been regarded by architects as susceptible of effective constructional treatment, in consequence of which it has been almost entirely relegated to that class of speculative builders which has sprung up around us in response to the demand for the cheap and rapid erection of dwellings for the middle class, and which found in Portland cement a material of which they were not slow to recognise the advantages as a means of effectually waterproofing their buildings, and hiding their scamped-up work, and at the same time capable of receiving a great deal of decoration at a very small outlay. Now, Portland cement, we venture to think, deserves better at the hands of architects. It is a building material of undoubted value, capable of great delicacy of treatment and accuracy of line in the mouldings; has been proved, when properly worked, to be exceedingly durable; and, last, but not least, will render a building impervious to the weather even in the most unsheltered situations.

So much for its good qualities. Now let us take into consideration the objections most generally advanced to its use. Perhaps the most frequently-raised objection to its employment is that it is "a sham." Junior members of the profession, enamoured of "Queen Anne" red brick, and critical amateurs, are especially prone to this cry. Said one of the former to us a short time since, "I like a building to appear what it really is; I don't like to see honest brickwork covered up and made to look like stone." Now supposing a building to have been covered with Portland cement, treated after the manner of stonework, with jointings, heavy projections, &c., in style, the general appearance, texture, and colour of the material are such that not even the veriest tyro in building matters would be deluded into supposing it to be stone; and it certainly is a question whether a thing be a deception that deceives no one. As regards the non-expression of the real substance of the building, we can see no more untruth in covering a brick building with cement than in casing it with a facing of stone, or in coating the same wall internally with plaster.

More valid objections are its monotonous and unpleasant colour and the unvarying "deadness" of its surface; and these, to say truth, form the principal drawbacks to its use. The speculative builder cuts the knot by utterly disregarding its true nature, and treating it as a sort of liquified stone in which he can perpetrate any monstrosity that may enter his head, at a trifling expense.

Putting this solution, however, aside, a few suggestions occur to us in respect of this question of architectural treatment. To begin with, we are practically debarred from relieving the surface and obtaining an effect of light and shade by mouldings of any considerable projection—the dead "flatness" should therefore be relieved by the shadow formed by the constructional rather than by the ornamental features of the design. Thus, by well defining the window reveals (care being taken at the same time not to make them mere "holes in the wall"), by carrying up piers and recessing the main face of the work, and by various other ways, an architect of any resource will readily seize on such portions of the plan as are available, and render them expressive features in the elevation.

The objectionable colour is a more difficult point to deal with, but even this may be overcome to a great extent by the judicious introduction of other materials in the design, remembering nevertheless to keep the Portland cement as the "ground;" and merely using the other substances as adjuncts. For this purpose red or black bricks may be legitimately used either as string courses and bands or otherwise. Mr. Collcutt has shown a successful treatment of this kind in his house in Fleet-street. Geometric tiles may also be inserted in this way with good effect, but require using judiciously, and with care not to select too bright colours, the tiles retaining their brightness after the cement has become discoloured by age, and appearing with supernatural brilliancy after each shower of rain. The pattern should, generally speaking, be in small pieces, and not too striking, and the tones rather neutral than otherwise.

An admixture of colouring matter with the cement itself has been tried with some degree of success, the coloured material being used in bands in the same way that courses of stone of different colour are sometimes employed; but there is considerable difficulty in ensuring the permanence of the colouring matter, and the other methods are perhaps preferable.

The general "motif" of a design in Portland cement should, we think, be Classic, the detail inclining rather to Grecian than Roman profile in the mouldings. So many accessories—the jointing of the stone and brickwork, the colour of the material, &c.—go to make up the *tout ensemble* of a picturesque Gothic building, besides the design pure and simple, that the style is wholly unsuited, both in character and detail, for the material of which we treat. Those who call to mind the lifeless reproductions of Gothic work in cement at the commencement of the "revival" will not be much disposed to dispute this proposition. Classic work on the other hand—at any rate, in our climate—depends more upon the general outline and massing of the design itself; and without adhering too strictly to style, we feel, as we said before, that the type should certainly be Classic. The value of plaster as a decorative material for interior work is receiving a considerable share of attention from our leading architects, who adopt it freely, and with plenty of precedent for so doing. Elizabethan work is especially rich in examples, many of which are remarkably suggestive for the treatment of its modern cousin. The figures in low relief on the exterior of the Ancient House in the Butter Market at Ipswich, and the pargetted work so frequent in Suffolk, are cases in point which recur to our mind. Mouldings will be found invariably of small projection, not exceeding what may be legitimately brought out in the material itself, and buildings will be generally found finished with a deep eave or bold coved cornice to prevent water running down the face of the walls and staining the work.

For domestic work in exposed situations, and for large buildings of plain character, Portland cement seems to us especially adapted, and although, no doubt, there exist strong prejudice and certain objections not to be overlooked, we think that it has, withal, scarcely had a fair share of the attention it deserves. Nevertheless, while advocating a fair field and no favour, we cannot repress a shudder when we think what may be, and even already is, done with it in the hands of the "Victorian" architect.

JOHN W. SIMPSON.

THE FAILURE OF CONCRETE AT CAMBRIDGE.

The failure of concrete floors in the New Comparative Anatomical Schools at Cambridge, which occurred in February last, forms the subject of a special report by the Museums and Lecture-rooms Syndicate to the Senate of Cambridge University, in which all the circumstances and subsequent correspondence are set forth in detail. Although the building itself was a comparatively small one, the correspondence is instructive as showing the incapacity of concrete to resist tensile strains, although it behaves admirably under compression. It is explained that the school buildings were designed by Mr. W. M. Fawcett, and were erected under his superintendence in two contracts by Messrs. Bell. When nearly completed on Feb. 18th last, a slab of concrete forming the northernmost compartment of the roof gave way and fell to the ground, carrying the floors with it, and three men at work on it. The syndicate on the following day instructed Messrs. Arthur W. Blomfield, M.A., and Thomas M. Rickman to examine and test the soundness and stability of the concrete floors throughout the building. In their report they state that the structure was three stories in height, and about 40ft. from the ground to parapet, and having a basement under part of building. The external walls, which varied from 2½ bricks to 2 bricks in thickness, were of ample strength. The floors and roof throughout were constructed of concrete of an even thickness of 6in., and excepting the roof perfectly level. The passages, landings, and roof were finished with cement paving, making a total thickness of 7in. The floors were carried on rolled iron joists of the following weights and sizes:—18ft., bearing 9¼in. deep, 25lb. per foot run; 20ft., bearing 10in. deep, 33lb. per foot run; 24ft., bearing 12in. deep, 43lb. per foot run. The concrete floor was carried down from the top of the girder to the bottom flange by a filling-in finished with a slope, and at the top of each girder was a joint between the several slabs of concrete. This concrete was filled in over boarding, which formed a level centre for it, and which was originally set with a camber of ⅜in., which was brought down to a level line by the weight of the concrete before it set. The concrete was made with six parts of clean-washed shingle passed through a 1in. gauge, and one part of clean-washed sand, and one part of the best Portland cement, with sufficient water thoroughly to set in one hard mass, and was fully up to this standard. The accident seemed to have been caused by jarring in lifting a coping-stone, and involved the fall of

a whole compartment of concrete, 18ft. by 11ft., and the destruction of each of the floors on which the masses fell. The report adds that the concrete in the floors was very hard, although it did not contain so much sand as might have been used. The roofing material was, however, decidedly inferior, and no floors could be expected to withstand the fall of 4 or 5 tons of material. A portion of one of the girders, 7½ft. long, was subsequently tested by Mr. Kirkaldy, of Southwark, and found to be more brittle than could be wished for. It bore a load of 19½ tons without deflection, but broke under 35 tons, and proved to be crystalline instead of fibrous in texture. Messrs. Blomfield and Rickman therefore considered that the joists were not of sufficient strength for the purpose, and that the floors were so designed that any use to which they might be put trenched in many instances seriously on the working margin left in the calculations. Mr. Fawcett demurred to some of the conclusions in their last report, and to the proposed strengthening of the girders, and was permitted to test, with Mr. Mullett, two of the existing floors. They bore, the one a strain equivalent to 2 cwt. per super. foot, with $\frac{1}{16}$in. temporary deflection, and the other nearly 3 cwt. with $\frac{3}{16}$in. deflection. Mr. Baldwin Latham, C.E., was consulted by Mr. Fawcett, and pronounced the cause of failure and settlement in the concrete floors to be due to inherent defects in the material when applied in a large building liable to settlement from compression of the foundation, or from settlement in the walls. Concrete, he remarks, is often liable to fall from a simple jar, owing to the drying of the outer faces before the interior has set from crystallisation. As the material will resist a very great compressive strain, but cannot withstand a tensile strain, it ought not to be used in large slabs. The girders in this particular building were insufficient, and should be strengthened throughout the building. Plans were then prepared by Mr. Fawcett, in consultation with Mr. Latham, providing for the reconstruction of the faulty compartments of roofs and floors, and for the strengthening of the rest by additional girders and columns, and were approved by Messrs. Blomfield and Rickman. The syndicate, however, were not altogether satisfied with the new plans, and it was eventually decided, on the advice of Mr. Latham, to remove the whole of the concrete roof and replace it by one of wood, slated; to reconstruct certain bays of the floors—these, as well as those which have fallen, to be of wood in place of concrete, and to strengthen the other floors with additional ironwork. These works were undertaken at once; but, owing to the sagging and cracking of some of the old floors during the work, Mr. Latham was again consulted, and it was determined to remove the whole of the concrete floors except that on the ground level, and replace them by wood. The question of the respective liabilities of Mr. Fawcett and the University for the cost of these works of reconstruction has been referred to the arbitration of Mr. Chas. Barry, P.R.I.B.A., who has taken evidence and inspected the building, but has not yet made his award.

THE ARCHITECTURAL ASSOCIATION.

A CONVERSAZIONE at the Architectural Union Company's rooms, in Conduit-street, inaugurated on Friday evening the new session of this asssociation. In the lower galleries were exhibited art needlework, wall-papers, enamelled plaques, vases, and other specimens of decorative furniture, lent for the occasion by manufacturers and upholsterers, a number of water-colour sketches by Messrs. R. Phené Spiers, E. E. Deane, and the late Walter Severn, sketches of Belgian town-halls and cathedrals, by Mr. John Coney, and framed architectural designs. In the large gallery a selection of music was played at intervals by the band of the 2nd Life Guards. The attendance of ladies and members was so numerous as to render locomotion a matter of difficulty.

The large room above the galleries had been thrown open for the evening by the Institute Council. On the walls were hung the premiated series of designs and drawings, and other samples of the work done in the Association classes last session. The measured drawings of Waltham Abbey illustrated the late Norman character of the nave in its massive piers, triforium and clerestory, and chevron mouldings, the Decorated chantry forming the east end of south aisle, and the square-set tower, the upper part of which is quite unworthy of the flint and panelled base. We noticed no references made to Mr. Burges's reconstruction of the east end. The group of drawings to which the first prize in the class of design has been awarded are conceived in a late phase of 13th century work; those placed second are Renaissance in character. The designs submitted in the colour decoration class for a Jacobean ceiling are not of the first rank. The best—those of S. Vacher and H. W. Burrows—are too minute in scale. In this room, which appeared more dingy and stuffy than ever,—as the Institute premises improvement scheme and Mr. C. J. Phipps's plans, still in embryo, suggested themselves to mind—the President for the new session, Mr. Henry Louis Florence, A.R.I.B.A., took the chair at 8.30. Having referred to the list of candidates for membership (37 in number), hung in the lower room, the president proceeded to distribute the prizes for the last session offered by, or through the Association, as follows:—

Essay, résumé on Viollet-le-Duc's "Vaulting," 2½ gs., awarded to R. E. Crossland, motto "Arches on Arches."

Measured drawings, £5 offered by Architectural Union Company, "Quis," A. B. Plummer (Waltham Abbey Church).

Class of Design.—Best series of sketches contributed in class, 3 gs., A. W. Hennings; 2nd, 2 gs., J. W. Fisher (Birmingham); hon. mention, F. R. Farrow.

Elementary Class of Design.—Best series of studies, 2 gs., W. J. Burrows; 2nd, 1 g., Eden Smith (Birmingham); hon. mention, R. G. Davis and H. C. Nixon.

Class of Construction and Practice.—Best series of papers submitted at class meetings, 2½ gs., R. E. Crossland; 2nd, 1½ gs., B. J. Capel; hon. mention, F. R. Farrow.

In his inaugural address the PRESIDENT claimed for the Association the credit of accomplishing good and necessary work, for it carried on six classes without engaging from outside teachers either paid or unpaid; it had established a lending library of 2,000 vols., the only one in the profession, and it issued a yearly sketch-book, and organised series of visits to buildings, and an annual sketching excursion of a week's duration; 106 new members joined last year, and the roll of membership now included 820 names. Last session the classes of construction and of elementary design were specially successful, and new arrangements were about to be made with reference to others. The question might be asked, was the education imparted by the Association sufficient to fit the architect to fulfil his threefold duties as builder or man of business, man of science and artist? It was not. It might be an excellent adjunct to the every-day training of an architect's office, giving opportunities for method, study, and testing his work with that of others. But surely the young architect ought not to be left to the help of fellow-students alone. Further, when, by unwearied work and patience, he had attained a certain degree of knowledge and skill, should he not be protected from those who take equal rank and title with him, not in virtue of their knowledge of art or their skill, but by the easy process of inscribing it on a brass-plate? He did not advocate the granting of a diploma, but that admission as associate of the Institute only be allowed as the result of examination. From the new impulse now being given to the cultivation of the arts accessorial to architecture and the great consistency between the interior and exterior of houses, he confidently anticipated a revival of interest in architecture, and he regarded it as a healthy symptom that criticisms on architects, even by self-sufficient and self-admiring writers, were read and examined by the public.

Mr. BLASHILL urged the younger members to enter in greater numbers for the prizes offered. As adjudicator on the essays he had regretted much that only one essay was sent in response to the invitation, although this was of more than average merit.

Professor KERR said the Institute experienced the same difficulty in getting essays from its members. While it was well that the young architect should cultivate the use of the pen as well as that of the pencil it was true that they would in actual life be very much more occupied with the study of drawing than in composition. There was, he thought, every reason to be satisfied with the progress of draughtsmanship among our younger men of the present day, and this development of skill deserved every encouragement. Looking at the idea broadly it might be said there were two great schools of art in Europe at the present time, and that these corresponded very nearly to the two great divisions of races—the Latin, represented by the French and Italians; the Teutonic, exemplified by the English, and after them by the Germans. Between the races there was an essential distinction in genius and character—a difference apparent at once in a comparison of London and Paris. In the French there was an extreme refinement, neatness, delicacy, and fineness—in the English an energy, earnestness, masculinity, and vigour. These distinctive features characterised the art work of the two nations, and extended to their draughtsmanship and designing, and consequently to their architecture. The defect of English architecture was a tendency to become clumsy, even coarse; of that of the French to be lost in elegant frivolity. Since the public taste was setting more distinctly every year in favour of refinement he would suggest to the student the necessity, if he would keep pace, of adding some of the charm and piquancy of French draughtsmanship to the vigour and force of his own school. In conclusion Mr. Kerr alluded to the fashionable Queen Anne as a classic style reverted to for the sake of change, developed on those principles of picturesqueness that were used in Gothic. In its use he warned the members not to fall in designing into mere quaintness and frivolity, into comicality of which they would hereafter be ashamed, and above all not to allow themselves to be self-deceived by representing buildings in their drawings otherwise than as they would appear when carried out.

Mr. JAS. FOWLER, of Louth, concluded the speeches of the evening by giving details of the excursion in August last to Hull, and in the course of his remarks he mentioned the characteristic features of some of the principal buildings examined and sketched during the week.

SCHOOLS OF ART.

OXFORD.—The annual distribution of the prizes and certificates to the students of the Oxford School of Art took place on Friday. The reports showed that the classes were attended by 149 students against 197 in 1877; 690 drawings were sent to South Kensington, and gained one full award in the elementary class. The second grade examinations in drawing were attended by 42 students, and 61 from other institutions. 11 pupils gained 14 passes, and 16 external candidates 19 passes. Regret was expressed that the statistics showed a falling off both in numbers and results as compared with previous years. An address was delivered by the chairman, the Rev. St. John Tyrwhitt, in which he characterised as the great obstacles to art progress in England an indifference to the decorative or beautiful side of human life; falsehoods and shams, and technical tricks in the execution of so-called æsthetic objects; the rapid changes of fashion; and, lastly, the habit of collecting works which one does not understand, and as an investment, for the sake of a final flare-up at Christie's—a custom which encourages imposture of all kinds. As a remedy for the inevitable using-up of the best known art patterns and designs, and to meet the demand from the public for something fresh, he urged the study of "field art."

A church is about to be built at the corner of Jamaica Level and Fenner road, Bermondsey, from the designs of Messrs. Coe and Robinson.

The other day, as workmen were digging the foundations in carrying out alterations to the house to the west of Carlisle Cathedral, now occupied by Canon Chalker, they found a row of holes in the ground. Mr. C. J. Ferguson, the diocesan architect, suspected these might contain part of the piles of the original nave of the cathedral, which it is known, prior to the Civil Wars, extended to Paternoster-row. He, therefore, had plaster run into one of the holes, and when it had solidified he found he possessed the cast of a rough oak stake. The cast has been placed in the City Museum.

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ILLUSTRATIONS.

MANCHESTER SCHOOL OF ART—DETAILS OF COUTANCES CATHEDRAL—NEW PREMISES IN NEWGATE-STREET—"BUILDING NEWS" CLUB DESIGN FOR VILLA RESIDENCE

OUR LITHOGRAPHIC ILLUSTRATIONS.

COUTANCES CATHEDRAL.

These drawings of one of the west towers of this cathedral are from very careful measurements, and half-inch scale details of the whole tower and spire, which were made and completed on the spot by Messrs. A. S. F. Kirby and W. S. Fraser, of London, under great difficulties, in July, 1877. Many of the unpleasantnesses and interruptions to such a work were greatly reduced through the kind courtesy of the resident architect for the cathedral, and who was greatly interested in the progress and completion of the drawings. The cathedral is so well known that little need be said of its architectural excellence, though it may be of interest to state that the present building is considered by M. Viollet-le-Duc and M. De Caumont to have been completely rebuilt in the early years of the 13th century. Other well-known writers also say that the entire cathedral belongs to the first half of the 13th century, and that it is one of the most complete examples of the French Pointed Gothic. The two towers of the west front are similar in design, only varying slightly in detail, and are both complete, and almost of equal height. Had the spire of the central lantern tower been finished, this group of towers would have equalled any other group in France. Next week we shall give the general drawings of this tower, including plans of the several stages.

MANCHESTER SCHOOL OF ART.

The accompanying plans of this building, which stands upon some 1,200 square yards, will sufficiently explain its purpose, and the manner in which it is arranged for the different classes, &c. It is perhaps only necessary to add that the main front faces north, and that it has been necessary to plan all the principal studios so that they shall share the north light, which the teaching authorities have demanded should be very ample, high, and vertical, without any top light; hence the great amount of window space with which the main front is riddled. The land at the rear of the building may be ultimately used either for a group of art galleries, to which the school would have access from the hall at the foot of the staircase, or it may be sold; in either case the School of Art Committee have required that no windows should be put out on the south, except in areas—a condition which, it will be seen, has had much to do with the form of the plan. The two galleries provided on the second floor, together with the corridor connecting them—they are all top lighted—are for the exhibition of students' works, or for the exhibition of works purchased by or lent to the school authorities for purposes of study, to which the public could be granted access on certain days. In either of them, too, could be given lectures or addresses bearing on the works exhibited, or in connection with the regular course of study. For this reason they are planned so as to be reached from the main entrance and staircase without the public interfering much, if at all, with the regular students. The private studios, on the same floor, are proposed to be let to students for special work, or to those who might be studying in the galleries, but not going through the School of Art course of study. The building will be faced on two fronts with stone. The balconies to the first-floor windows are provided for the safe and easy cleaning of the glass, which will not all be hung to open.

NEW PREMISES, NEWGATE-STREET.

This conspicuous building is now in course of erection on a commanding site at the corner of Newgate-street and King Edward-street. The building was designed by Mr. James W. James, of 5, Adelaide-place, London-bridge, and is intended as a banking-house, or to have the ground floor divided into shops; the upper floors are arranged as offices. The works are being carried out by Messrs. Braid and Co., of Manor-street, Chelsea. The building is constructed of thin red bricks (five courses to a foot) and red Dumfries stone, at a cost, exclusive of the fronts to ground floor, of £4,618.

"BUILDING NEWS" CLUB—DESIGN FOR VILLA RESIDENCE.

For a description of this illustration see our review of the designs submitted in competition on p. 461.

COMPETITIONS.

Halifax.—The School Board invite plans for a higher board school for 250 boys and 250 girls.

Liverpool Art Club.—This club announces a competition for amateur painting on porcelain and pottery, not confined to members of the club or residents of Liverpool, but open to all amateurs, but not to those who depend upon painting on pottery or porcelain as a source of income. Two prizes will be given: 1. A Venetian glass mirror; 2. A jar, probably of Hungarian manufacture. The conditions of the competition are as follow:—1. Each example must have the letters L.A.C. and a monogram or other distinctive mark burnt into the clay, to show that it has been painted for this competition. 2. Specimens sent in for the competition must be accompanied by a sealed envelope bearing on the outside the monogram or mark above named, and containing inside the full name and address of the competitor. 3. Delivery of the examples, unpacked, to be made at the club between the 25th and 30th April next, and to remain there so long as the committee of the club may desire, but to be entirely at the risk of the exhibitors, who will be expected to remove them at the close of the competition. All communications respecting the competition to be addressed to P. H. Rathbone, Esq., president of the Art Club, Liverpool.

The Mile-end vestry have instructed Mr. Knight, their surveyor, to prepare plans and obtain estimates for a disinfecting oven to be erected on the premises of the vestry at Canal-road.

What has been styled "the oldest bit of old Kensington"—the conduit built by Henry VIII., and commonly called Queen Elizabeth's Bath—has been removed during the past month.

The foundation stone of the new buildings about to be added to the Presbyterian General Assemblage College, at Belfast, was laid on the 17th ult. The additions consist of a chapel, a faculty-room, a block of students' chambers, a president's house, and two professors' houses, all erected at the sole cost of an anonymous donor of £10,000.

At St. Luke's Church, Bethnal-green, a new dado of marble has been erected in the chancel. The work was carried out by Messrs. Ashton and Green.

A new Wesleyan chapel was opened at Rejerrah, Newlyn East, Cornwall, on Thursday, in last week. Mr. T. Carne, of Newquay, was the architect of the chapel, which seats 150 persons, and cost £320. Mr. John Pascoe carried out the masons' work, and Mr. Moyce, of Chacewater, the carpentry.

Advantage is being taken of the pulling down of some old buildings belonging to the City of London and the Stationers' Company, in Wood-street, to widen that street on the south side of Gresham-street. The buildings taken down formed remnants of the old Wood-street Compter Prison, which was rebuilt in 1535.

ECONOMY OF FUEL AND PREVENTION OF SMOKE.

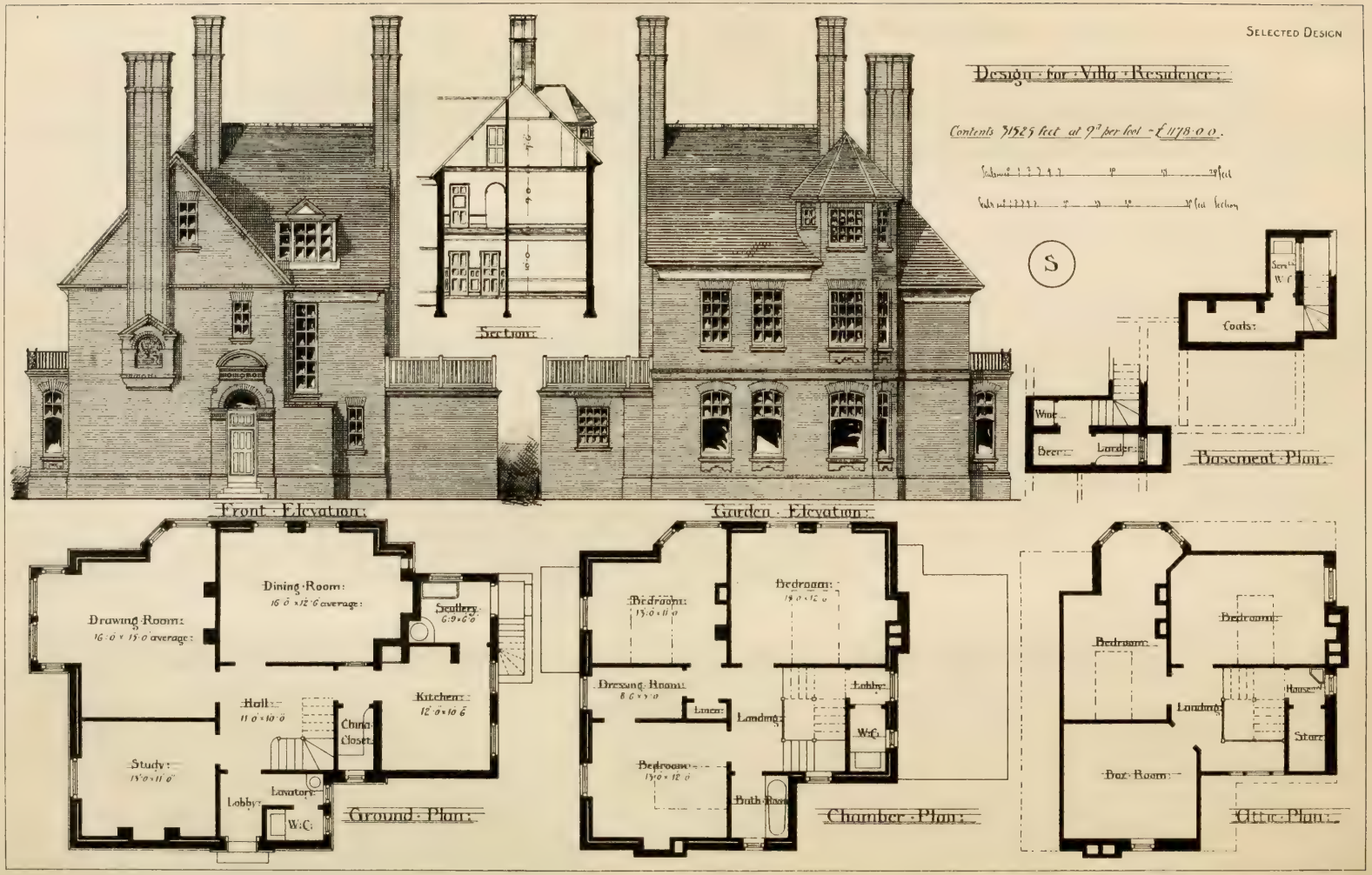
In Mr. Bourne's comprehensive treatise on Steam and Gas Engines, reviewed by us the other day, some valuable data are furnished in the appendix respecting the best form of boiler to prevent smoke, and the best means of firing, the main conclusions of which may be of interest to builders and contractors using steam power. Extensive series of experiments on the evaporative power of various descriptions of coal and forms of boiler were carried on at Wigan a few years ago. Coal-proprietors and boiler-makers were invited to co-operate in these trials, and the result showed that the South Lancashire and Cheshire coals had a high economic value, and were able to evaporate 11·28lb. of water at 100°, to 1lb. of coal, without making any smoke beyond a slight trace. But the subject has more interest for us when we search into the result of these inquiries as they affect the form of boilers and the mode of firing usually adopted. In the experiments a two-flued boiler with steel tubes, one with iron tubes, and a conical water tube boiler were tried, and to make a fair trial of these the best mode of firing had to be considered.

Three modes of firing were adopted—the "spreading" firing, the "coking" firing, and the "alternate side" firing. The first, or "spreading," is that usually employed, and makes so much smoke. It consists in scattering the fuel over the whole fire, beginning at the bridge and then gradually working forwards to the fire door, while the second or "coking" plan is to heap the fuel on the dead plate in front of the furnace, the crust of which after being coked, is pushed back and a fresh charge of coal is placed in front again, while the "alternate" side plan is to place the coal on one side only, so that one side of the fire is black while the other is bright, and to change sides alternately. The result of the three systems was in favour of "coking firing" as evolving less smoke, though side firing appeared of advantage with "slack." Comparing the boilers, the results obtained are given as follows:—"The patent conical water-tube boiler is not practically superior to the plain two-flued as regards prevention of smoke; nor is the plain two-flued practically superior to the patent conical water-tube boiler." The steel flued boiler appeared to have no advantage over the iron, so that as regards economy, speed of evaporation, and prevention of smoke, any of the three boilers was practically as good as the other.

Speaking of mechanical firing, the report favourably mentions Messrs. Vicars (of Liverpool) self-feeding fire-grate, applicable to boilers fixed externally or internally, which proved very successful in the prevention of smoke as well as economy of evaporation, but when firing with round coal it had no superiority over hand firing. Of the merits of round and slack coal it has been found that there is a loss in the use of slack coal, and that by its use either speed must be sacrificed or smoke made. On the vexed question, which is the best part of the furnace to admit the air, at the door or at the bridge, it was decided that no practical difference is found to exist. With regard to the form of boilers, the report says, in conclusion, "it has been found that those of the plain two-flued construction aided by a water-heater, are able to develop a very high result. We have evaporated as much as 10½lb. of water at 100° by 1lb. of coal, on a firegrate 4ft. in length, and 10½lb. on a firegrate 6ft. in length. In both cases this has been done without smoke."

These experiments, imperfect as they are, show smoke may be prevented, whether mechanical or hand firing is used, without special appliances, or when the combustion of the gases is assisted by driving in currents of air by jets of steam, the smoke nuisance may be much abated. Coking has a great deal to do with the result. Firing is an art, and to a large extent smoke-producers are the stokers, and we quite agree with the remark, "Educate the stokers in their art, and smoke will be prevented." At the same time hand stoking will soon be a thing of the past, and some mechanical method of feeding the furnace continuously will obviate the nuisance.

SELECTED DESIGN



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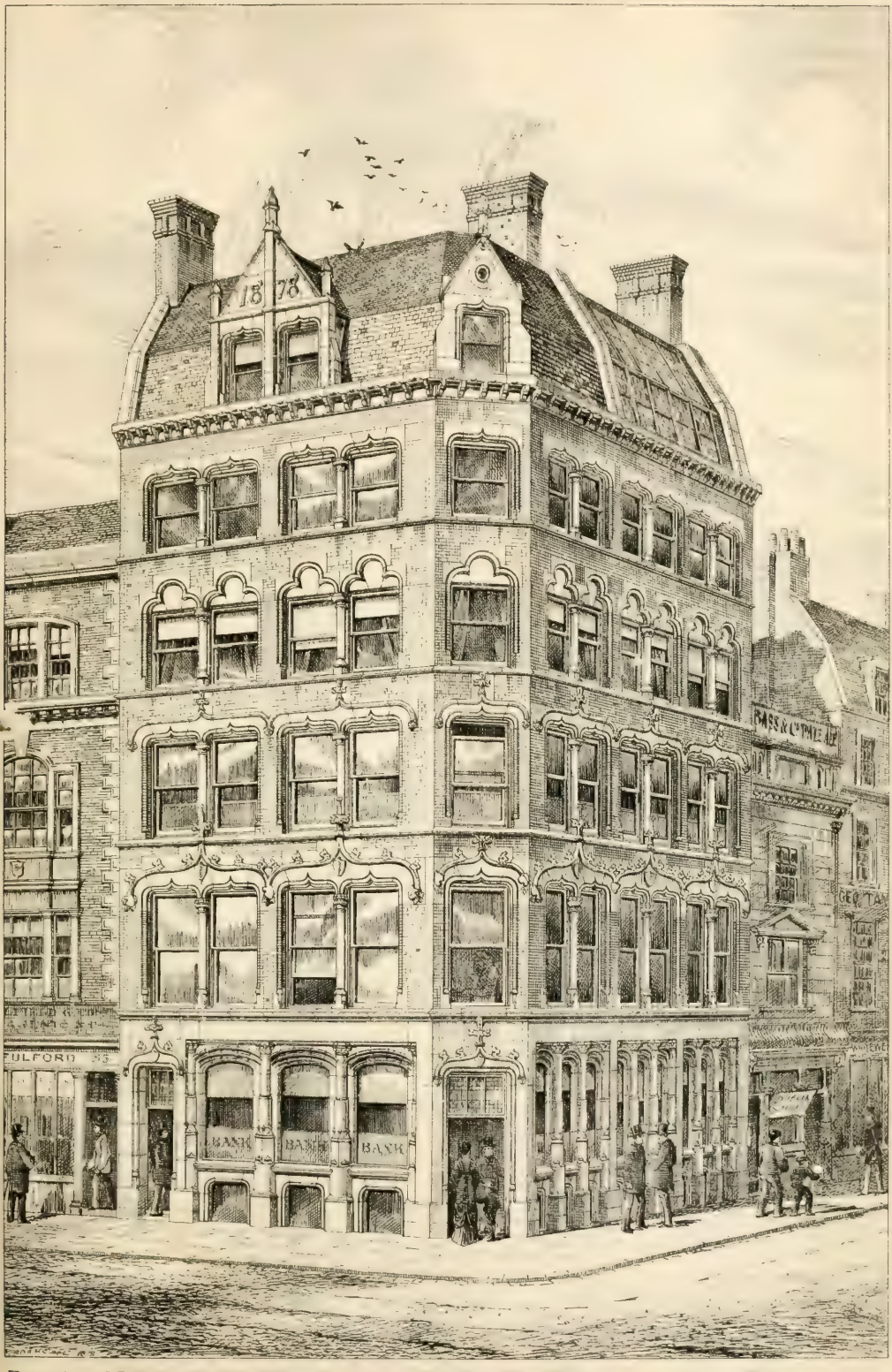

Premises NEWGATE STREET & KING EDWARD STREET CITY for John Mixer Esq. James W. James

BUILDING NEWS DESIGNING CLUB.

REVIEW OF DESIGNS FOR VILLA.

WE have received, in response to our first invitation, an overwhelming number of designs for a villa—over fifty; and as we cannot discuss in detail the merits of all of them, we adopt the course we formerly employed of classifying the drawings, dealing only with those which seem to come up to our standard of requirements. Three designs compete very closely in points of economy of plan and design. These are "S in circle," "Sunflower," and "Yesram." They are all conceived in a Jacobean style, and are tolerably free from those barbarisms of the period which some of the competitors have mistaken for picturesqueness. To give a word of advice to those who are following this *ignis fatuus* of fashionable architecture, we may point out that true picturesqueness or quaintness is not a quality the real architect of the 16th or 17th century ever tried to imitate, but rather an accident of commonsense planning and design, and we wish to remark that it can never be forced upon an unwilling public in the absence of the essentials of home comfort. Many of the designs we have received betray a desire to imitate the quaint and Quixotic, and the entire conception has been governed by this predominant idea, under the false notion, apparently, that such work is more artistic and less prosaic than plain wants honestly provided for. "S in circle" we illustrate to-day. We place it first for two reasons—the economy of its plan and its unaffected design. We cannot fail to remark a certain character inspired by the work of a well-known architect in the style. The corbelled chimney shaft and a few other features, come home to us more as a plagiarism than an original effort to make the best of a necessity; but we acknowledge nevertheless a simplicity of grouping that is redeeming. The ground plan is concentrated, though not very happily adapted to the site, and the rooms are of fair proportions—there is no lost space or dark passages. A lobby, with lavatory and w.c. adjoining, has an inner door, and opens into a hall, around which the reception rooms are grouped. The dining-room, 16ft. × 12ft. 6in., is conveniently accessible from the kitchen; there is a serving lobby shut off from the hall, and a china closet in handy proximity therewith; the kitchen offices are compact, and the drawing-room and study, with windows facing the side or garden front, are well placed. A certain irregularity of outline is given to the drawing-room, the half bay of which makes a pleasing semi-octagon feature in the garden elevation, with a hipped roof termination. Ascending the stairs we come to a lobby, w.c., and a bath-room, all placed conveniently, while the bedrooms follow the plan below, are all accessible from a spacious landing, without any useless passage or waste of space, and a convenient dressing-room and linen closet is arranged in a lobby recess. The attic plan shows three bedrooms and housemaid's store, and the basement has a convenient store for coals, with side steps, and a servants' closet, and a small wine-bin, larder, and beer cellar. The author has further studied economy in cubic space, and the kitchen and scullery are roofed low. The cubical contents are 31,525ft., and this worked out at 9d. = £1,178. The outer walls are hollow. The drawings are conveniently arranged on the sheet—a condition of some importance, and one we hope our competitors will bear in mind. One of the omissions we notice in many of the plans is a tradesmen's entrance. In some cases a second stairs has been provided; this we think unnecessary in a house of moderate size. "Sunflower," which we hope to illustrate shortly, has the merit of compactness, and the hall is not too large or frittered away; besides which the author has brought his kitchen within easy access of the dining-room, which is 19ft. × 14ft., though we notice one omission—there is no service door. The butler's pantry, opening into the kitchen, and the china closet and curtained lobby between kitchen and hall are good features; so are the covered bays and conservatories, which open out of the dining and drawing-rooms. The treatment is plain and suitable, the cubing being calculated at 31,975ft. The drawings are well arranged. "Yesram" has another very good plan, covering about the same area: the hall, as it should do, forms a centre of convenience—the dining-room, pantry, and kitchen have convenient doors—there are no useless passages, and the reception-rooms are well placed, and are well lighted, with folding-door communication. Upstairs there is a capacious landing, large enough for a linen press, a decent dressing-room, and a lobby and w.-c. from the stair landing, but the external design is much below the mark, the hip end over bay and the porch especially being singularly poor and unhappy. The upper windows are too square, and the cove cornice of porch is ludicrously out of character. Only the arrangement atones for these defects. The cubing is 30,662ft., at 9d., including offices. "St. Lucy" stands next in the quality of economy of ground floor; but we note one defect—an ill-lighted staircase—unless the author had in view some means of borrowing light over the store-room. A serving door from kitchen to dining-room is an omission. The scullery is small but sufficient, and the bedrooms well planned as regards doors, fire-places, and beds. Style is Gothic, sensible as far as it goes, save a little jumbling in the roofs. The cubing is put at 9d. per foot. "Percy Vere" does not send a bad plan, though we dislike a staircase facing the front door, and we have a similar aversion to loss of space by a separate hall and staircase. A want of economy also appears in the arrangement of bath-room, w.-c., housemaids' closet, &c., on the upper floor. Why two lobbies? The kitchen offices, service hatch, and lobby between them and dining-room are complete and convenient. Of the elevations, we can only say—Enough of Queen Anne! If anything will sicken us of the style it will be such whimsical features as gabled bases to chimneys, and little bits of rococo ornament stuck here and there. The author has judiciously told nothing about cost; neither shall we, except the less said the better. Drawings, with motto "Try," show a pleasing Gothic treatment, except the upper tiled finish to the bay window—piquant but useless. The detail, however, is simple and sensible. In plan, we find fault with the rather awkward proportions of the drawing and dining-rooms, and the necessity of having to carry a hot dinner through the hall to the dining-room. The best points are the compact office arrangement at the back, the position of stairs in hall, and the hollow walls. The cubing is not given. Of a very much more pretentious character than permissible for a villa to cost the modest sum of £1,200 is "Enigma." The hall, stairs, and offices are arranged in a rather palatial manner, though they are conveniently related, and the kitchen and service part of house is well separated from the apartments by a serving lobby and store closet. Upstairs the winding landing is badly managed, and the bedrooms are too cut up. "Enigma's" elevations are in a rather pleasing Jacobean style, but the cut panelled gables are too costly. Drawings are neatly done, but the plans would be better blacked in. The cubing is put at 32,000ft. "Mechlin" is the work of a gentleman whose motto recalls some successful work in our former series of this "Club." This time he is certainly not so fortunate, though the plan is economical with some good points. Thus the stairs is placed in a side recess of hall, and the kitchen is out of sight from the entrance, but we scarcely like the scullery opposite to it, notwithstanding double doors. A side garden entrance is a good point. The elevation in Queen Anne is rather elaborate in character, and the three front gables suggest an expensive roof, though it is somewhat picturesque. Cubic contents, 31,818ft., at 9d. The design of "Omega in circle" is too extravagant to look at, though there are indications of skill in design and a knowledge of some of the better features of the style. The plan, too, has some elements of success; but the communication from kitchen to dining-room is objectionable, and the drawing-room on the first floor is scarcely sanctionable at the expense of the bedrooms. In fact, the best bedrooms are on the second floor, which is unadvisable. Contents, 33,095ft. "I." is a clever sketch, that would take among those who look to the sentimental side of building only; but the plan is, spite some ingenuity, too erratic and expensive both to build and to tenant. The crooked corridors leading to the dining-room, with its capacious hearth, the china-closet leading out of kitchen, appear more cozy in plan than would please materfamilias. The tradesmen's entrance is a desirable feature. The author puts cost at £1,200—the reception-rooms being cubed at 9d., and the offices at 6d. "Q in square" is very compact—the plan is an exact square, with a projecting scullery, and the hall stairs, back entrance, and upstairs arrangement are cleverly managed. There is certainly much economy, but when we turn to the elevations we are shocked by the unfortunate irregularity and squatness of the windows, for which there was no need. Why put the bedroom window askance the entrance door, while it could have been made to align with it? The cubing is at 9d., and, if this works out at £1,200, we are sure many of the designs would cost double. "Spero Meliora" is defective in the broken outline of the plan; the kitchen and offices are not happily disposed, and the front and side of house is too cut up by bays. On the other hand, there is some refinement in detail, and the drawings are neatly executed. "E. T. S. in circle" is also a complete set of drawings. The plan is well arranged, though the hall and pantry would have been better smaller. A half-timbered Gothic style is adopted, suitable and well grouped, but the cost places the design far beyond the limit. "Tom Bowling" sends a plan of much ingenuity. The doors to kitchen and dining-room is well placed. The garden entrance, with the triangular lobby or greenhouse and verandah, is cleverly managed, but the elevations are somewhat commonplace. The site plan given is useful. "Cymraeg" has a side lobby and hall, and a side entrance to kitchen and offices, which are well closed from the main part of house; but the rooms are not of happy proportions, and the area covered is large. The elevations in a plain semi-Gothic style are simply treated. The contents equal 37,200ft. at 9d. = £1,395. "Jac" loses too much space in the entrance passage and hall, which divides the house, and the dining-room and kitchen are not in convenient proximity. We can scarcely admire the elevations, nor the streaky roof-shading adopted. "Curiose" sends us a plan in which the rooms and offices are well disposed. We do not like the position of scullery, nor the through passage from front vestibule to back entrance. Such an arrangement often destroys the comfort of a house. The dining-room also is rather small. The front elevation is not pleasing in its composition, but the details are suitable. "Venture" is the motto of a plan possessing much merit. The reception-rooms and kitchen offices are economically located, the closet and store to kitchen, the cloak-room, and pantry arrangements are cleverly arranged; so is the chamber plan, but the elevations are below par. Cubic contents, 31,950ft., at 9d. There is some decent planning about "Frappe Fort," but the scullery and out-offices are ill considered, and the hall rather cramped. Exterior elevation to road is rather lofty, and we cannot admire the cut skews and arches over the window openings, nor the high-shouldered projecting gable windows. "Omnia Vincit Labor" is clever in its hall and reception-room arrangement, but the scullery has no outer door, and the offices and bedrooms are spoilt. "Cleo's" entrance is not happy, and the servants' labour is disregarded in the location of rooms. Jacobean feeling is infused into the elevations, which have a smack of comicality about the chimneys. The plans of "Prenez Garde" indicate a consideration for housekeeping necessaries, but a little less fancy in the front elevation would have been better. A rather rough-looking set of plans is sent by "Chimney Pot." A little more study in the doorways of the reception-rooms and offices would have been well spent. The design "Heliogabulus" exhibits the danger of implicit faith in a style. The author's plan, though carefully drawn, and indicating labour, is exceedingly inconvenient; the kitchen offices are cramped and ill-devised, and the reception-rooms are awkward and uncomfortable. Who ever would like to project a drawing-room in front, three sides being outer walls? Consideration and fitness have been painfully sacrificed to the frivolity of quaint design. "Semper Fidelis" has a compactly

grouped plan, but lacking study. The dining-room would have been better placed where the drawing-room is shown. A three-storied villa was not necessary, and the several low roofs, though they group picturesquely, are scarcely appropriate for a suburban villa. Another Gothic design is that of "Ora et Labora." It has merit in the plan, but the aspect of rooms are not the best that could have been chosen. "D in Triangle" has a fairly good plan, compact and carefully drawn, the sanitary details being shown, but the elevations are conceived in a rather used-up style. We are glad to see, in "East Anglian" another old face, and we can discern much improvement. The plan lacks condensation and economy in hall. The elevations are neatly drawn.

In a second group we have only space left to glance at "C in circle," "Bonnie Dundee," "R in circle," "Semper Spiro Spero," "Peto," "Design," "Through and Dagger," "Use," "Tam o' Shanter," "Montague," "H in circle," "Cross in circle," "Cyprus," "Umble Uriah," "Daisy," "Nil Desperandum," "Pecksniff," "Ich Dien," "Amateur," "Jack Spratt," "B. M. W.," "Ogmore," "Signum," "M in leaves," "Maltese Cross in Circle," "Che Sara Sara," "Maltese Cross," "Viv," and "Iota." The above enumeration is made as nearly as possible in the order of merit. Many of the designs exhibit good points in arrangement, but the faults most conspicuous are wasteful entrances, ill-lighted halls, want of access between the kitchen department and the reception rooms, lack of skill in wall alignment, which only practice can overcome, and various crudities of design in the elevations. Some are commonplace, others unworkable, but the authors of several of the designs are capable of more successful results. One of the faults common to all novices in the art of arrangement is that of uneconomical division of apartments, and we trust our criticisms and published the plans will do something towards removing this weakness.

JOINERY DETAILS.

The drawings we have received for this subject are not certainly equal to our anticipations. Some of them show deplorable want of practical knowledge of joinery detail, while not a few are poor copies of other work. We place "J." as the first. The elevation of dining-room fire-place is a reasonable treatment for a moderate villa. The cupboard over the shelf and the corner brackets are framed in a simple manner; the staircase is massive, and characteristic of the style, and the mouldings of door, balusters, &c., show a knowledge of this class of work. "Mechlin's" fire-place, though its general conception is good, lacks proportion; it does not look high enough; the window is better. The staircase balustrade is too open and scant, and the detail might be improved. The woodwork is to be painted cinnamon-red in flat colour, and the paper to be in two shades of sage green, relieved with white. "Omega" goes in for a much too elaborate scheme of decoration in the chimney-piece. The fire-place is proposed to be lined with blue Dutch tiles, the inside jambs and mantel being of Rouge Royal marble. We do not like the door hinges, and the mouldings given are too small to be of use. The details by "Spero Meliora" are somewhat commonplace, but neatly and correctly shown. "Stone"—these details are very roughly drawn, and give us the idea of being copies. The design of stairs and fire-place is good, but the drawing execrable, and the mouldings scamped. "R in circle" sends a neatly drawn sheet, the mouldings to door, architraves, and staircase are quiet and simple, but we do not like the brick details of doorway. The design of fire-place by "Semper Fidelis" reminds us of one by Mr. Godwin, and the drawing, in spite of some good detail, savours too much of a facsimile. "Dalgarno"—we do not like the perforated filling-in between the balusters, and the chimney-piece and door are heavy, and not happily proportioned. The other details are commendable. "Frappe Fort" is rather roughly finished, but the mouldings possess merit, and the architraves to the doors, &c., are appropriate. The bay in spandrel of step is unmeaning. "B. M. W.'s" contribution lacks knowledge of style; and the fault of "Ogmore" is that he should have wasted time in sending such crude ideas of joinery. To them and others we give the advice—consult and study good examples, and bring to the exercise of design that sense of fitness without which such detail may become ridiculous.

BELLS OF BELGIUM AND ENGLAND.

In an interesting article on the "Bells of Belgium" in the *Echo* the Rev. H. R. Haweis asks:—"Will the English ever awake to the charms of bell-music, which have been for two centuries the pride and glory of Bruges, Mechlin, Ghent, and Antwerp? When we have such bells and such carillons—but not before. At present a big bell is the terror of a neighbourhood; it depreciates house property, it scares lodgers—why? For two reasons. First, because the bell is usually bad; it torments the ear, tears the tympanum with vile upper partials—*i.e.*, in addition to the fundamental note, the note of the bell, can be heard the jarring sound of the third and fifth preponderant. In a good bell the note or tonic of the bell, A, let us say, should be distinct, then fainter the third, C, then fainter the fifth, E, should be heard; but in a bad bell the third and fifth, or even other upper partials, are louder than the fundamental note itself; hence a vile noise, not a musical note, and hence the laceration of the ear. Secondly, however sweet and clear, one bell becomes monotonous; but two bells are less so, four bells less, and a musical series of bells, playing at intervals sweet musical cadences, not only ceases to be oppressive, but exercises that fascination which is almost always felt by the traveller who stays quietly in a Belgian town for a day or two, and which he misses when he moves away.

"The mechanism used in these ancient bell towers is of two kinds. The clock music is played by a revolving barrel, or cylinder, pierced with holes, into which are fitted little spikes, which lift keys connected with long wires, which pull the hammers striking upon the bells up aloft. These same bells are also worked from a keyboard, consisting of two rows of jutting pegs and a row of pedals. The carillonneur, stripped to his shirt, sits at this magnified keyboard, and strikes these pegs, working the pedals with his feet. At Mechlin the barrel weighs 1½ ton, containing 16,200 holes, and the present tunes for the hour are produced by 2,900 nuts or spikes. The tunes are changed twice a year by the carilloneur, M. Denyn."

In a second article on the same subject in the *Echo* Mr. Haweis asks:—"Is it not an odd thing that whilst these enterprising Belgian towns scruple not to supplement and recast whole sets of forty and fifty bells, we allow Big Ben to hang for years cracked and discordant in the middle of London—the wealthiest city in the world? Is it not odd that a people who pay so highly for music and profess to love it so much should tolerate the Westminster quarters, struck 96 times per diem, or 35,040 times a year, systematically out of tune—thus vitiating the public ear to such an extent that the errand boys of the neighbourhood now whistle the quarters wrong? Let us gratify, if we must, our national pride by recasting Big Ben at home, but let us entreat the ancient city of Westminster to get a set of quarters over from Belgium as a model, until we have won the secret of casting that simple progression of notes in tune."

In reply to a commnnication to the *Times*, also sent by Mr. Haweis, and somewhat similar to that in the *Echo*, Sir Edmund Beckett replies in the former journal as follows:—"Though I do not profess to write about dominants and minor thirds, or to guess how a Belgian bell-founder would probably begin to retune this peal, I have no hesitation in saying that no modern Belgian bells which have come over here and been heard in public are superior or equal to the best English ones, though they are superior to such as used to be made by the English firm which had a practical monopoly of the business until about 20 years ago. There has never been a really good large foreign bell in either of the English exhibitions, and I have not heard of any conspicuously good ones in the foreign exhibitions which I have not visited myself. The tenor of the peal at Boston Church was re-cast in Belgium, when a great number of little bells were added for chimes a few years ago, and they are as unsatisfactory as I predicted. That is a good sound bell, but no better than many English ones of the same size, and in my opinion not comparable to the 11th of St. Paul's, or several of the Worcester Cathedral bells. I omit the tenor of St. Paul's as yet, because the clapper was not right when I went to hear them rung the first time a few weeks ago, and I told the founder so. Of course I agree with Mr. Haweis about the present condition of Big Ben, of Westminster, which is a disgrace to the nation, as it was to its founders, and as their York bell was still more, and as the clock bells of St. Paul's were to their predecessors, and Tom of Oxford to its maker, which is the worst of all the great ones. These could easily be re-cast now into good ones, as I have explained in all the later editions of my book on clocks and bells."

Leaving the musical part of the subject to these more conversant with it, Sir Edmund Beckett also asks—"Why the designers and makers of bells and bell frames are to attend to 'all that Mr. Haweis and others have written' against allowing the frames to touch the walls? And who are the 'others?' Certainly not Mr. Ellacombe, an old pupil of the elder Brunel before he went into orders, and a well-known practical writer on bells. Perhaps Mr. Haweis will let us know the names of 'some of the finest towers in the land' which he can prove to 'have been ruined by this practice.' If 'wedges' have been 'rammed in between the tower walls and the rafters,' and if by 'rafters' he means the upper beams of the frame, it is wrong. But I do not believe they have. Certainly there were no wedges there when I inspected the frame. If there are continuous thin boards to fill up the space between the frame and the walls, it is quite right. Even if there were discontinuous wedges, they would do no harm in a tower of that enormous thickness, which does not vibrate the least under the ringing of this large peal, as nearly all church towers do merely by the elasticity of the fabric, and with no harm so long as it is confined to that. Bell frames ought never to be allowed to batter the walls by just touching them occasionally; and in weak towers the upper beams had better not touch at all. Perhaps Mr. Haweis will impart to us his secret for preventing the lateral thrust of bells from reaching the walls somewhere, except, indeed, by building up what is in fact an internal tower of wood from the bottom, as at St. Michael's, Coventry. Whether it was necessary or not in that tower, which is a weak one for its height, it would be an utterly erroneous proceeding in a tower half as strong as this of Sir Christopher Wren's, whose attention to all details was so admirable that not a bit of stone has had to be cut or added, except (I think) a few corbels, to receive this grand peal and to provide all proper accesses to it. Only some louvres must be added to keep out rain and snow."

ARCHITECTURAL & ARCHÆOLOGICAL SOCIETIES.

Exeter Diocesan Architectural Society.—Last week the annual meeting of the Exeter Diocesan Architectural Society was held. The Rev. J. L. Fulford read a report of the district meeting in August last, which described in minute detail a visit to Hartland Church, North Devon. Mr. R. Medley Fulford read an interesting paper, "Architectural Notes of a Trip to the Valleys of the Loire and Seine." These notes were principally made in the autumn of last year, during a fortnight's trip to the Valley of the Loire and back by the Seine; and were also the results of a few days' excursion with the Architectural Association to some of the most interesting churches in and around Paris, in the autumn of 1874, under the guidance of the late Mr. Edmund Sharpe. The subject was illustrated by the oxy-hydrogen lime-light. On the motion of the Rev. J. Ingle, seconded by Mr. P. B. Hayward, the thanks of the society were accorded to Mr. Fulford, to the accuracy and vigour of whose descriptions the Earl of Devon warmly testified.

North Staffordshire Naturalists' Field Club.—The last excursion of this society for the present season took place on Saturday week, when a party of between twenty and thirty visited Penkridge and Stafford, under the leadership of Mr. James Yates. At Penkridge the principal features of the fine old church were pointed out by Mr. C. Lynam, who stated that the arcades in the nave and chancel were Early English, of a date somewhere near the end of the 13th century, and that the clerestory and tower were Perpendicular. He trusted that some day the western gallery would be removed, the tower arch opened, and the fine west window disclosed to view. This would add one bay to the length of the nave and greatly improve the church. At two o'clock the party took train to Stafford and walked along the bank of the river to St. Thomas. The remains of the abbey fish-stews were first visited, and then the party proceeded into the garden, and Mr. Lynam pointed out all the remains of the abbey church and the conventual buildings, and showed by the help of a plan of Croxden, to what part of the ancient monastery the remains belonged. Arrived at Stafford, St. Chad's Church was visited, and Mr. Beresford described the building. From St. Chad's the visitors passed on to St. Mary's. Here Mr. Flamank gave some interesting particulars respecting the Saxon church, dedicated to St. Bertelin, and which, until the beginning of this century, joined up to and communicated with the west end of St. Mary's. Mr. Flamank also gave an explanation of the symbolism of the font. Mr. Lynam also made a few observations, and among other things said that the wall tablets at St. Mary's presented a valuable and rare series extending from the 15th century. The party took tea together at the London and North-Western Hotel.

At a general meeting of the subscribers to the East Anglian Art Society, held at the Museum, Norwich, on Tuesday week, it was decided, in view of the increasing sympathy shown in its work, to place the society on a permanent basis, and with that object a trust deed submitted to the meeting was sanctioned. The society was established two years ago, and has acquired a small but choice and representative collection of pictures by local artists.

On Thursday in last week the first schools erected by the Gloucester School Board were opened. They have been constructed from the designs of Messrs. Medland and Son, by Mr. James Clutterbuck, contractor. Accommodation is provided for 254 infants, 203 boys, and 203 girls. The buildings are arranged in detached blocks, one of these being of two stories, for girls and infants, and facing Napier-street, and the other of one story, for boys, parallel with Widdin-street. Each schoolroom is 62½ft. by 20ft., and each classroom 22ft. by 18ft. The style is simple Italian; the facing materials are red bricks and Bath dressings. The cost has been £3,231—not quite £5 per head.

The personal estate of the late Mr. John Penn, engineer, of Greenwich, has been sworn under £1,000,000.

The strike in the stone trade at Rastrick and neighbourhood, in the West Riding, has ended in the men returning to work at the masters' terms.

A new Wesleyan chapel, at Huntingdon, was opened on the 18th. The style is Gothic. The front walls are of Clipsham rough stone, with Bath and Ketton stone dressings, and handsome buttresses and pinnacles. The building will seat 500 persons. The contractor was Mr. G. Thackray, and the architect Mr. R. Hutchinson, both of Huntingdon. The cost of the chapel is £2,350.

A pile of buildings to be used as a police-station for the borough of Wakefield was opened last week. The new premises, in part, are an adaptation of a building already existing, but the main front and the chief constable's house are of Classic design, and executed in the best Huddersfield stone. The total cost, exclusive of the site, has been about £7,000. The designs were prepared by Mr. Pagan, the borough surveyor, and carried out under the direction of Mr. G. H. France.

St. Mary's Church, Kensworth, built and consecrated in the reign of Edward the Confessor, was, on Saturday week, re-opened by the Bishop of St. Alban's after having been closed for three months in order to carry out the necessary repairs under the direction of the architect Mr. Gordon Hills.

The parish church of Kill, county Kildare, has been reopened after the substitution of open benches for square pews, adding, after removal of a gallery, 100 sittings to the accommodation, and the additions of new pulpit, reading desk, and communion rails to the church furniture.

Building Intelligence.

Glasgow.—Contracts have been made for the erection of a new church for Duke-street U.P. congregation. The new building, which has been designed by Mr. John Honeyman, will occupy the east side of a new square, which has been formed by the destruction of a large block of very old houses near the cathedral—an improvement carried out by the City Improvements Commissioners. It may be interesting as indicating the unsettled state of the building trade, to mention that the highest tender (for mason work only) was £9,741, and the next £9,266, while the two lowest, made on the same quantities, were £6,916 and £6,498.

Metropolitan Board of Works.—At Friday's meeting of this board the following contributions towards local improvements—being moieties of the outlays—were directed to be paid:—Lewisham district board for widening Sydenham-bridge, £2,231 10s.; Islington vestry, improvements at Hornsey-rise and Hornsey-lane, £225, and at Fort-place, Blackstock-road, £70; St. Giles's-in-the-Fields vestry, for converting the disused burial-place of St. Giles's into a public garden, £150. Sanction was given to the Poplar district board for borrowing £25,500 for granite paving works, and £500 for wood paving; to Kensington, £13,055, for wood paving works; to Strand guardians, £6,000 for new infirmary; to Fulham guardians, £8,500, for casual wards; to St. George's-in-the-East guardians, £2,600, for enlarging infirmary and workhouse workshops; and to Shoreditch vestry a further sum of £15,000 for the Sun-street improvement. Amongst the additional assistants to be employed in the solicitor's department it was resolved to appoint "an officer experienced in litigious business; and in conducting prosecutions under the Building Acts," at a salary of £300 a-year, and the works committee was directed to advertise for applications, and submit to the board the names of six candidates. As to the proposed experiments with the electric light, an offer from Messrs. Ransomes, Sims, and Head, of Ipswich and London, to supply an engine of sufficient power to drive a 20 Gramme machine and an efficient man to manage the engine at £3 10s. a-week, was accepted. It was decided to apply to Parliament, in conjunction with the City Corporation, for an extension of the corn and wine duties until July, 1900, in order to provide funds for the erection of the proposed iron Tower-bridge, and, should the sanction of the Government be obtained to this step, to proceed with a bill for the erection of the bridge next session. Attention having been called to an omission in the Building Acts Amendment Act of last session it was resolved, in the event of the introduction in next session of any amendment bill to insert clauses prohibiting the casting into any sewer of substances leading to cause injury to the fabric of the sewers; hindrance to the flow of their contents, or of their cleansing; danger, annoyance, or nuisance to any person employed in or near the sewers; danger or risk of injury to the health of any person whomsoever; or nuisance or inconvenience to the public or persons whose premises communicate with or abut on the sewers. The engineer presented a week's return of traffic in respect to the recently-freed toll bridges, proving, as compared with the four weeks previous, that at Waterloo Bridge the foot passengers had increased from 94,635 to 194,023, and the vehicles from 26,416 to 46,600, while at Charing-cross foot bridge the passengers had increased from 47,038 to 97,669.

Tranmere.—The memorial stone laying of a new Primitive Methodist church and schools took place on Tuesday. The new church will be in the Italian style, and will be built of brick, with Storeton stone dressings. In the interior, the building will be 54ft. long and 36ft. wide, with galleries on three sides, and it will afford sitting accommodation for 550 worshippers. At the back of the chapel there will be a large schoolroom, with seven classrooms on the ground floor. The cost of the undertaking is estimated at £3,400. The architect is Mr. Owen, of Breck-road, Liverpool; and the contractor for the whole work is Mr. J. B. Smith, Mill-lane, Liverpool.

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All letters should be addressed to the EDITOR, 31, TAVISTOCK-STREET, COVENT-GARDEN, W.C.

To Our Readers.—We shall feel obliged to any of our readers who will favour us with brief notes of works contemplated or in progress in the provinces.

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"BUILDING NEWS" DESIGNING CLUB.

Drawings Received.—H. Winder.—C. R. D.—Bonnie Dundee.

R. K. (We thought it best not to state dimensions, so that each competitor may exercise his own discretion the more freely. We should say a meeting hall of about 40ft. by 20ft. would be sufficient, but we do not wish this to be taken as a rule.)

Correspondence.

RESTORATION OF DURHAM CATHEDRAL.

To the Editor of the Building News.

Sir,—I was a few days since at Durham Cathedral. I certainly did not admire the top-heavy screen or the foolishly-bedizened pulpit; but money wasted on these costly works I thought of little moment in comparison with its flagrant misuse in the destruction of old work. Outside the main north door I saw two heaps of stones, principally voussoirs of Norman arches, ornamented with double chevron. The stones were in excellent preservation, many of them displaying the original tool marks in perfection. Regretting the rough treatment they had received, I supposed at first the stones were put there for re-use, but on closer inspection I saw they were without the necessary markings for recognition, and were thrown there as rubbish. I inquired of the verger whether this could be the case. He said, "Yes; they came out of the towers, being found out of the perpendicular."

I consider, Sir, it a great shame that such things should be—talking and pretending, as architects do, that their intention is to preserve. I should like all the subscribers to the Cathedral restoration fund to see these two heaps—four or five tons of high and reverend antiquity—destroyed for the benefit of the architect and builder. And how much more of this sort of thing may not be done! The subscribers might well consider the expediency of entirely withdrawing from such restoration (!) as this. Moreover, mischief, I expect, would not be confined to the destruction of these 12th century arches and replacing them with 19th century imitations; but, as the stones were at least 18in. deep, the wall must have been much pulled about to dislodge them. If, as the man said, they were out of the perpendicular, I suppose it would not matter. It certainly does matter to pull a wall to pieces to get away the facing features of old work and then destroy them. The stones being mere rubbish can probably be had for the asking. It is to be hoped that some person with taste will take possession of them, and put them together as ornaments for his house or grounds. It would be better than that they should be broken up for road-making.—I am, &c., P. E. M.

THE INSTITUTE AND COUNTRY MEMBERS.

Sir,—The Council of the R.I.B.A. has during the last few years been very anxious to enrol "country" members, and the present president, Mr. Chas. Barry, has shown himself specially active in setting forth the claims of the Institute to the adhesion of architects practising in the provinces. Resulting from this some of those who had hitherto held aloof (I do not know how many) have been induced to join the Institute. It seems to me, however, that before the R.I.B.A. can ever be truly a British Institute there must be a very radical change in its constitution. At present a country member sends up his four guineas a year to London to maintain a place of meeting and a library for London members, and to pay the cost of printing the "papers," this last being the only portion of the expenditure in the benefits of which he can usually share; for, though a few may have occasional business in London, the great majority can make no use of those other advantages.

While thus contributing to support the headquarters of the profession equally with London members, he has also to support his own local society. While as a member of such society he can use his influence in the conduct of it, and in the admission of new members, he has practically no voice whatever in either of these directions in the R.I.B.A. On the contrary, outside of his own society, in his own town, he finds men, hardly known to him or to the profession, dignified with the five magic letters—F.R.I.B.A.

Mr. Barry thinks all the members should be on an equality in point of subscription. That would be quite right, if they had equal privileges and equal advantages. Is it not possible then to devise a scheme by which the profession could be consolidated, and the advantages thereof obtained? I think it is, and my scheme in outline is this:—

In every town large enough let there be a chapter of the Institute comprising all the members thereof residing within a given area; the endeavour should be to include in this chapter every practising architect who had proved himself qualified and also trustworthy; the chapter should elect members (who would be full members of the Institute, fellows or associates as may be). A certain proportion only of each member's subscription should be remitted to London; the local society, or chapter, retaining the remainder—say, one-half, for its own expenses.

As to business all matters affecting the profession generally should, after being considered in London, be remitted to the chapters for their consideration and decision, and then be reconsidered in London, the votes of chapters, if need be, being taken on a basis previously fixed or according to the aggregate numbers voting. On the other hand, all purely local matters would be dealt with by the council and by the chapters for their respective districts.

In this way every member, in whatever part of the kingdom residing, would feel himself to be indeed a member, and not merely a person paying an annuity for five capital letters to be attached to his name. Instead of a "conference" an annual meeting of the "Institute" would comprise, besides the London council, the president, vice-president, and secretary of each chapter, and instead of "conferring" they would discuss, debate, and *decide*, and do business.

Whether the Institute under its present charter can reconstitute itself in the form suggested it is for itself to consider, but it is futile to suppose that under the present arrangements it can ever represent the entire profession.—I am, &c., W. R. Corson.

Manchester, 29th Oct., 1878.

CANTERBURY CATHEDRAL.

Sir,—Two of the contributors to your valuable "Commonplace Column" are somewhat unfortunate in having selected parts of Canterbury Cathedral as examples of Early English. "W. W." names, among other examples, the "west front;" and "J. A." includes in his list the "screen or south side of choir."

I hope "W. W." will be glad to learn that the nave, including the west front, is Perpendicular of the end of the 14th and early part and middle of the 15th centuries. "J. A." will, I hope, also be glad to be informed that the screen on the south side of the choir, as well as that on the north, is Early Decorated—the date, as he says, 1304. I believe, however, that he would find it difficult to discover any churches or parts of churches of this date executed in the true Early English style.

As regards Canterbury Cathedral, it furnishes no examples of pure Early English, and, even in its various and constant changes, never has. It is true that pointed arches and detached columns, &c., occur in the choir, but even in the most eastern portion—the latest (completed before the commencement of the 13th century)—many of the distinctive features mentioned by "J. A." are entirely wanting, and the style of which we are so justly proud, as being really and truly indigenous, did not receive its full development till the 13th century was well advanced. The eastern part of the cathedral may therefore be said to afford an example of very early Early English.—I am, &c.,

Canterbury, Oct. 29. Geo. Smith.

"OLD WARWICKSHIRE HOUSES."

Sir,—Will you allow me to point out that, in your review last week of this book, my name is incorrectly printed *Nevin*? Also, as it would be inferred from your reviewer's concluding remarks that copies of the work are no longer to be obtained, permit me to remove this impression. Though only, from the nature of the book, a limited number of copies were printed, they were not confined exclusively to subscribers.—I am, &c.,

Princes-square, W. W. Niven.

St. John's Church, Bootle, was reopened on Sunday, after the execution of extensive repairs and improvements. The interior of the edifice has a flat-pitched single-span roof to a broad nave without aisles, and the walls are simply plastered and devoid of any architectural features. The scheme of the decoration has been to supply this deficiency by arcading, maroon-coloured, springing from the corbels of the roof principals, and carried around the church. The spandrels of the arcade are enriched with foliated and diapered ornamentation in alternate bays. The gable walls of nave and transepts are similarly treated. The larger portion of the walls is coloured with plain tints in three horizontal stages, divided by bands and illuminated texts. Within the chancel the walls have a conventional pattern of pomegranate fruit, forming a high dado, and above are texts and ornamental bands. The nave and transept windows have been reglazed by Messrs. Forrest and Son, of Liverpool. Messrs. Lillyman and Co. were the decorators, and the work has been carried out on their behalf by Mr. Forrest, from the design of Mr. H. B. Bare, of Cook-street, Liverpool.

The parish church of St. Andrew, Sandon, Essex, was reopened on Sunday week after restoration from the designs of Mr. Charles Pertwee, of Chelmsford. The roofs of the nave and its aisle, which had fallen into decay, have been replaced by new ones, open timbered, with arched principals. New heating apparatus has been introduced, and other improvements effected. Messrs. Gozzett and Beckett were the builders.

The crowning stone of the spire of the rebuilt Church of St. Mary, Whitechapel, was successfully placed on Tuesday week. The work of re-erection of the church has been carried out at the sole expense of Mr. O. E. Coope, M.P., from the designs of Mr. Ernest G. Lee. The tower, together with the interior of the new church and some details, was illustrated in the Building News of Sept. 8, 1876.

Intercommunication.

QUESTIONS.

[5567.]—**Air-chambered Siphon Traps.**—Will one of your correspondents kindly inform me whose air-chambered siphon traps are used at Headington-hill Hall, near Oxford, and referred to in a paragraph in the *Standard* of last Monday, the 28th ult.?—R. G. Thomas.

[5568.]—**Boarding up Windows.**—Will one of your numerous correspondents be good enough to give me a little information on the following:—A has two windows overlooking the property of B. Up to recently B had a workshop light overlooking A. Neither party's windows have been in existence 20 years, but, in neighbourly courtesy, A, upon enlarging his premises, compensated B for the inconvenience caused by the closing up of his windows, which compensation was decided by an architect, and mutually approved. This compensation was paid also upon the understanding that B should not interfere with A's lights, except in case of B's building. Now, however, through some little unpleasantness between the parties, B has blocked up A's windows, not only completely shutting out the light, but also conducting damp in rainy weather into and through A's wall, although, apparently, no plugs are driven. The boarding is placed tight against A's wall. Has he any remedy?—Darkness.

[5569.]—**Salt Stains in Brick Walls.**—I am doing up a house and in one room they have been in the habit of salting bacon against the outside wall, and the bricks are thoroughly saturated with salt. The outside is coloured, but of course shows a bad stain. How can I prevent its showing? Will cementing or painting do?—C. C.

[5570.]—**Temporary Conservatory.**—I want to put up a conservatory, about 30ft. × 18ft., against a house (which is held for a very short term) in such a way as to prevent its becoming a landlord's fixture. I propose to put back foundations, which I suppose being rooted to the soil could not be removed, but merely to lay the framework on this, and to so arrange the pitching plate, flashings, &c., where it would touch the old buildings that the conservatory could be unshipped, as it were, without breaking anything. Shall I be quite safe in doing this? I cannot make a detached building of it, as it would not answer the same purpose. If I put an asphalted floor should I have to take this up and replace the turf on terminating the tenancy, and would a boarded floor be better for this reason? Opinions will oblige—Temporary Conservatory.

[5571.]—**Stone in Piccadilly Buildings.**—I would feel obliged if some reader would favour me with the name of the stone (and any useful particulars in connection therewith) in the Burlington-house buildings facing Piccadilly and the Criterion.—H. G.

[5572.]—**Superficial Area of Cathedrals.**—Would some of the many readers of your esteemed journal kindly give me the superficial area in full of of the following cathedrals, &c.?—St. Patrick (Dublin), Glasgow Cathedral, Tournay Cathedral, Troyes Cathedral, Chartres Cathedral, Amiens Cathedral, St. Owen's Abbey (Rouen), Rheims Cathedral, Spires Cathedral, Strasburg Cathedral, Cologne Cathedral, Worms Cathedral, Trèves Cathedral, Church at Batalha (Portugal), Seville Cathedral, Basilica of St. John Lateran (Rome), Church of the Nativity (Bethlehem).—A Country Subscriber.

[5573.]—**A Glasgow Competition.**—On Feb. 1, 1878, in answer to an advertisement in the Building News, competitive designs for workmen's houses were delivered at the office of the Glasgow Working Men's Investment and Building Society (Limited), 141, Great Hamilton-street, Glasgow. May I ask through your columns if I am alone in hearing no result these nine months?—Present Enquirer.

[5574.]—**London Apprentices.**—To what privileges, if any, is an "apprentice" entitled in London, speaking of apprentices generally as a class, not merely those articled to architects?—Articled Clerk.

REPLIES.

[5532.]—**Dilapidation.**—The charge is 5 per cent. on estimate if the amount is large, but if small the charge should be by time. The specification or schedule only is necessary.—G. H.

[5550.]—**Brick Machine.**—I some time since saw a very simple one-horse brick machine in Lincolnshire. I know Mr. Sydney Turner, C.E., of Beverley, is the patentee, who will no doubt give full particulars.—J. W. Boville, Hull.

[5559.]—**Red Broseley Roofing Tile.**—In answer to "Rain-in," I soaked two of above for 12 hours only. Dry weight 5lb. 1½oz., increased 5½oz. when wet. The best roofing tiles are made in North Staffordshire.—Facts are Stubborn Things.

[5561.]—**Curve of Equilibrium.**—See note on "Catenary" in "Our Commonplace Column," p. 49 of present vol., published July 19th last. For mode of use and examples of Tudor period, see Gwilt's "Encyclopædia of Architecture," article, Principles of Proportion.—E. W. P.

Our Office Table.

From the "brown book" of the Architectural Association just issued, we see that the report, to be presented to the members on Friday evening next, records continued and satisfactory progress. The balance-sheet shows an income and expenditure of nearly £400, and a slight increase in the balance in favour of the association, which now stands at £665 9s. 8d. During the past session 106 new members were enrolled. A diminution is remarked in the number of donations to the library, which was largely used by members during the session. Allusion is also made in the report to the papers read at sessional meetings, to the Saturday afternoon visits to buildings made during the spring and summer, and to the annual excursion to the neighbourhood of Hull.

The annual report of the Birmingham branch of the Architectural Association, also published in the "brown book," is satisfactory, with the exception of the balance-sheet. During the year a large increase has taken place both in the number of members and in the average attendance at the meetings. A new class for time designing did not prove successful, and will not be continued next session. A life class and water-colour class were also started, and were carried on satisfactorily. For the new session the list of officers of the branch is:—President, Mr. William Hale; committee, Messrs. Alfred Read, A.R.I.B.A. (chairman), H. H. M'Connal, J. P. Osborne, J. Sutcliffe, and E. Wood; O. Essex, J. W. Fisher, and W. H. Kendrick (the last three *ex-officio*); hon. treasurer, Mr. A. Freeman Smith; hon. librarian, Mr. Eden Smith; and hon. sec., Mr. Frederick C. Hughes, of Queen's College, Birmingham.

Two Leeds builders were, on Tuesday, fined £5 and costs for allowing houses which they had erected within the borough to be occupied before they had been certified by the surveyor as fit for habitation. The proceedings were instituted by the town clerk, under the provisions of the new building bye-laws, and it was proved in one case that there were no ashpits, no privy accommodation, and no road to the property, and that in many other respects the houses were incomplete. To allow houses to be occupied without the accommodation specified in the case brought before the stipendiary magistrates at Leeds, is an offence for which no excuse can be pleaded, and for which no defence appears to have been offered, and we congratulate the Corporation of Leeds on their disposition to put the bye-laws into force, and wish other towns may more generally follow their example.

Mr. R. A. Proctor asks, in the *Times*, whether it is intended that the worn lower extremity of the obelisk on the Embankment should long remain an eyesore, like the upper extremity? No one would think of decking this relic of antiquity with modern ornaments. But, without doing this, Mr. Proctor thinks we might yet remove its present ugliness while possibly adding considerably to its stability. If the lower part of the obelisk were enclosed in a suitably moulded casing to a height somewhat exceeding that of the worn-off portions, the aspect of the obelisk would be greatly improved. That its stability should be increased due account would have to be taken of the relative expansions of the granite, and of the substance of the casing. The casing could not be too inconspicuous. It would not be departing from the original idea of these obelisks to cover the pyramidion with metal plates, carried up to the point where the faces, if complete, would meet. The metal should be of lighter tint than the obelisk. Originally, in all probability, the enclosing plates were of gold. Copper-gilt would serve in our time, or at any rate satisfy Mr. Proctor. Beyond agreeing generally with him as to the ugly and incongruous appearance of the obelisk as it stands at present, very few people seem to care much what is done with it.

It is by no means an unusual occurrence to find a vast difference between the highest and lowest tender for any work of considerable size, but it is not often that an architect is nearly twenty thousand pounds out in his estimate. Last week we published the tenders for the new town hall, museum, free libraries, and school of art at Reading, for which Mr. Thomas Lainson, F.R.I.B.A., is the architect, and although there was only about £6,000 difference between the tenders, the lowest was found so greatly to exceed Mr. Lainson's estimate that it has been determined to leave out the school of art block entirely for the present.

Dr. Whitmore's report for August and September, as medical officer of health for Marylebone, mentions four cases of enteric fever, which appears to have been caused by the father of the family being exposed when at work in the country to an offensive effluvium from open drains. Useful sanitary work continues to be carried out in the parish. During the two months 873ft. of new drains were laid, and about 200 drains and drain-traps repaired, while 107 houses and 122 yards were caused to be cleansed, and 55 yards paved or repaired.

At a meeting of the Carlisle Scientific Society on Monday week, Mr. R. S. Ferguson, the president of the Antiquarian and Archæological Sciety, expressed his indignation and regret that wanton damage had been caused to a series of fine inscriptions made by Roman workmen in a sandstone quarry in the Gelt Valley, seven miles from Carlisle. Not only have people written their names above the inscription in soft stone, but within the previous ten days some persons had cut with a metal implement their names or initials all over the inscription, thus destroying an historical record, part of which was made and isolated A.D. 207. He exhibited a drawing of the letters, and added that he should advise Lord Carlisle's trustees to cut down the path by the Gelt stream to the Written Rock.

A correspondent, writing from Lewisham, complains that sewage deposits are being carted from the low level sewer at Deptford into some open ground near his dwelling. The evil-smelling refuse is evidently meant to be used presently as "builders' sand" in the erection of "new and eligible suburban dwellings" in the locality. Meanwhile the foul effluvium arising therefrom is poisoning the neighbourhood. No redress seems obtainable, for the Board of Works for the district have declined to interfere, on the ground that they are powerless. In other words, as the correspondent referred to, most justly complains, "while the ratepayers of the metropolis have contributed hundreds of thousands of pounds towards sanitary improvements and the main drainage system, the contractors who are entrusted with the clearing of certain parts of the sewers can with impunity cart back to the thresholds of the inhabitants this highly dangerous and noxious matter."

The interesting series of "Studies in English Architecture," contributed by Mr. J. Langham, of Leicester, to our own pages during the past few months, has been republished by that gentleman, and is on sale at a moderate price by Mr. S. Birbeck, of Bromsgrove. The series includes several well-known examples, such as Whitby, Furness, and Thorney Abbeys, and many other almost equally interesting though less known buildings. We need say nothing here of the manner in which the drawings have been executed. Our readers have seen them already, and many will doubtless be glad to secure copies on better paper of Mr. Langham's sketches, which, besides being faithful and accurate representations of the buildings drawn, are characterised throughout by a picturesqueness and grace too seldom met with in architectural drawings.

CHIPS.

The Hon. Percy S. Wyndham, M.P., delivered a lecture on "Ancient Buildings," at Keswick, on Monday week, in which he advocated the views of the Society for the Preservation of Ancient Buildings, drawing largely for his facts and illustrations from Mr. William Morris's annual report as hon. sec. of that society. As an example of a house which had never been "planed down" to uniformity he instanced with approval the seat of Sir Henry Vane, at Hutton-in-the-Forest, a residence built at three different epochs. Restoration, he averred, meant "destruction accompanied by a false description of the thing destroyed."

At a recent meeting of the Urban Sanitary Authority of Basingsteke, a letter was considered from Messrs. T. Small and Sons, of Gloucester, stating that they would be unable to continue the drainage works, and attributing, as one of the causes, the heavy outlay on pumping and laying overflow and subsoil drains. It was decided that the authority carry out the work under the supervision of the drainage committee, the engineer, and the clerk of works, as day work.

At the annual meeting of the Royal Hibernian Academy of Arts last week, Mr. T. A. Jones was elected president for 1878-9, Mr. Augustus Burke as professor of sculpture, Mr. J. J. M'Carthy as professor of architecture, and Mr. Gilbert as professor of antiquities, were among the other elections to office.

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OFFICE: ON THE WORKS, KEYMER JUNCTION.

A new reredos has been erected in the parish church of Nettleton, near Lincoln. It is executed in Caen stone, with red and white marble enrichments, and inlays of Irish red and green marbles. Columns of similar material divide the compositions into five compartments. That in centre is occupied by a representation in white marble, carved in relief, of "The Last Supper," the panels next are inscribed with the Commandments, and those outside with the Apostles' Creed and Lord's Prayer—all the lettering is gilt. Messrs. Jones and Willis have executed the contract.

The Fulham district Board of Works accepted, on the 23rd ult., the tender of Mr. Scott, of South Molton-street, amounting to £5,671 net, for the erection of a new board-room and other alterations at their premises, Broadway House, Hammersmith, in accordance with designs prepared by their surveyor, Mr. A. Bean. We published the list of tenders last week.

The peal of ten bells at Aylsham, Norfolk, has been put in order, the sixth bell being recast. The work was executed by Messrs. Mears and Stainbank, of Whitechapel.

The vicarage of St. John's, Wakefield, has just been restored and improved by the parishioners as a testimonial to the incumbent. Mr. Watson was the architect, and Mr. Richard Mountain the contractor.

The Swansea Town Council have obtained sanction for the loan, decided last week to proceed with a scheme under the Artisans' Dwellings Improvement Act.

School of Art prizes and certificates were distributed at the Literary Institution, Colchester. The report showed that the classes have been conducted with success during the past year.

The Cambridge Improvement Commissioners, on Tuesday week, re-appointed Mr. W. J. Bowyer as town surveyor, raising his annual salary to £200, and £52 for hire of conveyances.

The Dartford Local Board of Health have appointed Mr. G. Mather as their surveyor.

New waterworks at Melksham, Wilts, constructed by the Trowbridge Water Company, have recently been opened.

A Wesleyan chapel, at North Aldershot, built at a cost of £2,300, from the design of Mr. Pocock, was opened on the 15th ult. It is Gothic in style, and seats 500 persons.

In the new Cabinet just formed at Adelaide, South Australia, the Minister of Education is Mr. Rowland Rees, the eldest son of Mr. Rowland Rees, architect, and an alderman of Dover.

A new Wesleyan chapel and schools are on the point of completion in Lower Union-street, Torquay; the style is Classic. The external carving is being executed by Mr. Harry Hems, of Exeter.

A police-station and lock-up are being erected at Whatley for the Corporation of Langport, Somerset. The contractor is Mr. Davis, of Langport.

The Leicester Secularists have decided on the erection of extensive new premises in Humberstone Gate. Their architect is Mr. W. Lamer Jugden, Leek.

The Moot Hall Courts, Newcastle-on-Tyne, have been re-arranged and decorated at a cost of £9,000, from the designs of Mr. Crozier. Mr. Robert Weedy was the clerk of works.

A bronze equestrian statue of Lord Gough, destined to stand near Carlisle-bridge, Dublin, has been successfully cast at Messrs. Masefield and Co.'s, Manor-road, Chelsea.

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WATER SUPPLY AND SANITARY MATTERS.

ABINGDON.—At a time when the treatment of sewage is being discussed with a view to the adoption of the best mode of cleansing foul liquids before discharge into rivers, ratepayers of many places will be glad to learn that the Abingdon sewage farm, after being held by the Corporation, has recently been let on lease at £4 10s. an acre, the tenant taking upon himself the duty of distributing the sewage. This will yield to the Corporation of Abingdon a return on the cost of the farm, and the outlay in preparation as well as the erection of farm buildings and a cottage for the manager, of 2¼ per cent., leaving the ratepayers to make up the difference between this return and the annual charge of 5 per cent. by which the first outlay will be repaid. Abingdon was sewered and the sewage farm laid out on the principle of intermittent filtration, combined with irrigation, by Messrs. Bailey-Denton, Son, and North, in 1876. If by this time three years hence the occupier is satisfied with his bargain we may hope that many small towns will be able to see their way more clearly out of the sewage difficulty than is the case at present. We trust the Abingdon authorities will not—as other towns have done—contribute to the failure of the experiment by shirking their part of the contract.

CAMBRIDGE.—As a result of the recent Local Government Board inquiry into the sanitary condition of the town and river, conducted by Major Hector Tulloch, R.E., the Improvement Commissioners of Cambridge have received a letter from the central authority, informing them that the inspector reported that there is no other outlet for the sewage of Cambridge than the river Cam. The communication pointed out that it is now illegal to discharge unpurified sewage into a stream, and that it is therefore incumbent on the commissioners to take such measures as may be required for the purpose of purifying the sewage. The commissioners have met to discuss this letter, and have resolved "That immediate steps be taken for diverting the sewage of the town from the river Cam, in compliance with the Rivers Pollution Prevention Act of 1875, and that Sir Joseph Bazalgette be requested to advise the board as to the best mode of doing the same."

WHITLAND ABBEY GREEN SLATES.
These SLATES are of a grey-green tint, are stout, and made in all sizes. A large stock available for immediate delivery. For further particulars (with a list of important buildings covered), apply to the MANAGER, Clynderwen, R.S.O., Carmarthenshire.—[ADVT.]

MEETINGS FOR THE ENSUING WEEK.

MONDAY.—Society of Engineers.—Paper on "Harbour Bars, their Formation and Removal," by Henry F. Knapp. 7.30 p.m.

THURSDAY.—Builders' Benevolent Institution.—Dinner at Freemasons' Tavern. 5 p.m.

FRIDAY.—Architectural Association.—President's Address, and Reception of Reports from Classes. 7.30 p.m.

Holloway's Ointment should be well rubbed upon the pit of the stomach and region of the heart in that particular form of indigestion which gives rise to palpitation, shortness of breath, and a suffocating sensation. Every distressing symptom soon yields, digestion becomes easy, the spirits light, and good health returns.

Trade News.

WAGES MOVEMENT.

EDINBURGH.—At a largely-attended meeting of the operative masons of Edinburgh and Leith, held on Saturday evening, it was agreed by an overwhelming majority to accept the compromise offered by the Master Builders' Association—viz., a reduction in the rate of wages of ½d. per hour and the readjustment of the bye-laws. In May last the wages were reduced 1d. per hour, so that the rate of wages henceforth will be 7½d per hour. A number of employers not connected with the Masters' Association have not yet signified their intention of limiting the reduction to ½d. per hour, and their men, to the number of several hundreds, still remain on strike.

LIVERPOOL.—The Liverpool master builders have notified to their men a reduction of 1d. per hour in the pay of joiners, bricklayers, masons, plasterers, and plumbers, and in the case of masons and plasterers 55 hours will be demanded for a week's work.

NORTH WALES.—At a meeting of the executive committee of the North Wales Quarrymen's Union, held at Carnarvon on Saturday, it was resolved that the proposals for a reduction in the prices of bargains notified at the Penrhyn and Llanberis quarries should, in the opinion of the union, be favourably entertained by the men, owing to the dulness of trade.

SOUTH SHIELDS.—During the past few weeks building operations in South Shields have been suspended, owing to the operative masons and bricklayers being out on strike against a reduction in wages of 4s. per week demanded by the masters. Last week a meeting of the Master Builders' Association was held, when deputations from the masons and bricklayers waited upon them, offering to submit to a reduction of 3s. per week. The masters, after some discussion, agreed to accept the offer.

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EXTRACTS FROM THE FOLLOWING PAPERS:—
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"And will, in our opinion, supersede any other similar system before the public."—BUILDING NEWS.
"It seems to meet the end in view more nearly than anything we have seen yet."—*The Field.*
"The patent has given high satisfaction to every one using it."—*The Christian Union.*
"Convincingly prove the new Glazing System to be worthy the attention of readers of the Keystone."—*The Keystone.*

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INODOROUS, SARKING, SHEATHING, AND HAIR FELTS KEPT ALWAYS IN STOCK. MANUFACTURERS OF
PERFORATED ZINC, PERFORATED COPPER, & PERFORATED IRON
IN VARIOUS DESIGNS AND GAUGES.
WROUGHT IRON TANKS,
PAINTED AND GALVANISED, OF IMPROVED MANUFACTURE.
CORRUGATED IRON,
GALVANISED AND BLACK IN ALL GAUGES, KEPT IN STOCK. ZINC WORK OF ALL KINDS.
FITZROY WORKS, EUSTON ROAD, LONDON, N.W.; Hatton Garden, Liverpool; Great Clyde-st., Glasgow; and at CYPRUS.

THE BUILDING NEWS.

LONDON, FRIDAY, NOVEMBER 8, 1878.

THE PALATINE HILL.

THE discoveries at Rome, of which we took notice three weeks since (p. 387), were completed by a series of explorations among the ruins on the Palatine Hill—the most celebrated among the famous Seven—and beneath the site of Hadrian's Villa. The Palatine Hill, or Rock, formerly covered by the villas of the rich or the gardens of impenetrable monasteries, became of recent years one among the most brilliant promenades in the Italian capital. Below it, however, was supposed to exist the real Palace of the Cæsars, and to unearth one of these was long ago an ambition on the part of archæologists. This classic eminence is a strong mass, about 2,000 yards in circumference, and from 90 to 100ft. high—the smallest, albeit the most renowned, of the Seven. Its interior has in many ages been ransacked for mosaics, statues, and other artistic relics, but without any great results until Napoleon III.—from whom the Italian Government subsequently repurchased the ground — bought the Farnese Gardens, which occupied the northern slopes. Many events intervened between the projects then announced and the work of which, within the last few weeks, the results have been announced. They go far beyond any that were anticipated. In the first instance, as we have noted, the Palace of the Cæsars was the grand monument sought to be exhumed; but, in seeking for this, all that remains of the City of Romulus was also brought to light, though even the most fervid antiquarians had given up every hope of coming upon a trace of it. The legend of the plough cutting a square outline has in some respects been justified, and the conjectural topography established as true. The way which led to these explorations was singular. A steep street, of comparatively modern construction, ascends the historical hill; beneath it were detected traces of another, striking apparently through the heart of it; this was followed, and a magnificently-paved roadway laid bare, when it was found that the foundations of the imperial edifices sought for had been built upon the remnants of others more ancient still—Cyclopean in their massiveness, almost savage in their architecture. Rome was always a city of walls and gates. One of the latter, reared far below the Arch of Titus, pointed out several paths which the explorers were not slow to follow. The first led to the ruins of, unquestionably, a temple, surmised to be that dedicated to Jupiter Stator, every vestige of which was believed to have been obliterated by the corroding process of time. It bears a Sabine date, and is a wonderful testimony to the traditions preserved by Livy. Near at hand some few and faint traces would seem to indicate the house of the first Tarquin, but their identity is not insisted upon by either the French or the Italian excavators, though they admit no doubt concerning the fact of their having discovered the genuine city of Romulus, with which, of course, the great Roman history begins. More interesting still, and less ambiguous, are those remains suggesting the spot on which stood the Temple of Vesta, upon whose altar flamed, unextinguished from year to year, the Sacred Fire. Close to them are the Tombs of the Vestals, or, at least, sepulchres agreeing in every respect with the description of the historian. Passing these the second gate of the Palatine was reached—the Roman gate opening upon the Street of Victory, above which stands, in our days, the uncouth Church of St. Theodore. Here was picked up a little image of a she-wolf, in bronze, identical in every respect with one which has long been kept as a priceless curiosity in the museum of the Capitol. Further on is a relic more remarkable still —supposing its authenticity to be credited—the house, or rather the hut, of Romulus the wolf-suckled, and founder of Rome. Of course, it is possible that many of these discoveries may have a supposititious value attached to them; but the site being, in a general sense, absolutely unchallengeable, the probabilities become all the less reasonable. The explorers sought in vain for anything suggestive of where stood the altar of Hercules, or the staircase of Cacus, yet they are confident of having approached, with more or less accuracy, their sites; and they insist that these identifications may be accepted without, in any manner, adopting the legendary annals of primæval Rome. The evidence of the wall is incontestable: Mighty blocks of sandstone, corresponding in a great degree with the substance of the hill itself, piled one upon another without cement, holding together simply by their own weight, arranged in regular tiers, according to their different lengths, and, as a result, strongly Etruscan in character. Nothing could well be more instructive than this, as throwing light upon the annals of a much-debated period, for a whole world of architecture and art is illustrated in the recesses of that Roman hill. Nothing which has been left to us by Etruria is equal to that which has been bequeathed by the professed imitators of the Etruscans. Even that relic of Servius, which breaks through the surface of Mount Aventine, surpasses all that the Tuscan territory can show. It is clear that these builders—the labours of whose hands are being thus disinterred—were not barbarians in the proper sense of the term. They possessed, at any rate, the instincts of grandeur, and of harmony in proportions, to a high degree. Moreover, these masses of masonry are found to bear peculiar marks—indicating, sometimes, the rocks whence they were quarried; at others, the places for which they were destined—many of the former being situated at a considerable distance. The inscriptions are not painted, but cut deep into the stone, and utterly abolish the claim of those on the tombs of the Scipios to be regarded as the earliest inscriptions on the monuments of Rome, or in the Latin language anywhere.

Many temples, new to the light of modern discovery, but old in the memory, as it may be termed, of tradition, have been restored by these French and Italian explorers to the light: That of Jupiter, the Conqueror; of the Peace Goddess, who reconciled quarrelsome households; of the Mother of the Gods, whose image was every year solemnly bathed in the Tiber. Next is distinguished on the new plan of the Palatine Hill, the House of Cicero, with the Portico of Catullus—the former razed, by a decree of Claudius, during the orator's exile, though restored some years later by the Senate, at a cost of £16,000 of our day. Both, however, appear to have been confounded with a beautiful building called, for no reason that we can perceive, the Baths of Livy, adorned with ornamental ceilings, groups of statuary, and painted arabesques on grounds of gold, out of all consonance with the simplicity attributed, as a rule, to the period of the kings. By degrees, however, the palaces of Augustus covered the hill, and their very basements, buried among the ruins of the earlier epoch, hid them from view. It was only by burrowing beneath them that they could, so to speak, be re-discovered. At the commencement, of the true Palace of the Cæsars only a commonplace house, after the Roman fashion, was made out amid the wilderness of destruction; next it was proved to have been encircled by stone colonnades—for marble had not then entered into the system of Roman architecture—and the structure thus grew, by uncontemplated degrees, into its ultimate splendid form. In the very midst of it, indeed, a miniature temple, dedicated to Vesta, has been recognised, by those unfailing signs which antiquarians know. Of the Imperial edifice itself—built in two stories—many parts are choked with rubbish, others empty; some are beautifully paved, with slabs of marble attached to the walls by clamps of *steel*. Fragments of lovely sculpture are said, too, to have been fallen upon; but, before the age of Augustus, marble was rarely used in Roman architecture. The boast of the Cæsar, "I found a city of brick, and shall leave one of marble," was literally justified. By "brick" he meant "terra cotta," and a prodigious amount of it has been penetrated by the excavators in the bosom of the Palatine Hill. But, as appears from the inscriptions already alluded to, when Rome began to be built of marble, it was from no neighbouring quarries, but of materials brought from the ports of Greece and Asia, Alexandria, and Carthage—and for the carriage of these prodigious blocks special vessels had to be constructed, as numerous medals, turned up during the late excavations, testify. In fact, some of the stone cut from the rock for this purpose was in the form and size of monoliths, obelisk-shaped, and long buried beneath the dust of Imperial Rome. Little of it, however, was marble; the vast proportion, in point of dimensions and weight, being granite. And amid all this ponderous architecture, covered over with dust and surmounted by the celebrated Hill, have been raked up metal blades and scabbards, pieces of lead piping, evidently for the distribution of water, and "eyes" for the reception, it would seem, of rails for stair carpeting. These lead up to noble chambers, with elegant cornices, with arabesqued walls, with sculptured garlands of flowers and fruit frescoes—five in a line—windows open, though of course not glazed, and hypothyral courts, whose arrangements must have been remarkable in every sense, and suggestive of equally remarkable manners on the part of those whose lives were passed among them—walls of lime-white, bordered by strips of grey, trellises of metal, artificial birds'-nests, representing the fancies of an Epicurean age: the whole opening upon a long street-like perspective, not unlike that of the unburied Pompeii, but furnished with terraced roofs and, in contrast, roofed balconies—a picture by no means ideal, for M. Boissier has just found it reproduced on a coin, or medal, exhumed from amid the lately illuminated ruins. Beyond all this, some examples have been amassed of an art utterly strange to European knowledge until now—two magnificent mythological pictures—the one representing "Polyphemus and Galatea;" the other, "Mercury delivering Argus"—the giant tumbling amid the waves, the nymph wearing a red mantle, clinging to a black-maned horse, and exhibiting a purity and whiteness of flesh on the uncovered parts of her body and limbs perfectly startling to those who have imagined that the primitive builders of Rome were little better than savage. The hills in the distance are beautifully clear, the trees surmounting them in shadowy perspective, the waters below transparent.

All this, assuredly, was not what these latest explorers expected to find. "There is nothing like it at Pompeii," writes M. Helbig, than whom a more competent critic of ancient painting does not live. "It suggests that these antique Romans must have gone to school with the Greeks." However, palaces, porticoes, streets, open in an immense perspective,

until the stages of the artistic and architectural history rise, as it were, one above another, and the most luxurious epoch of Imperialism has been reached. Strangely enough, nothing is left of Nero, either upon the inhabited surface or in the disembowelled Palatine Hill. Yet it was his ambition to rear a palace, "which should be a city in itself." But the narrow rock, already covered with temples and mansions, left no room for his desire, so he determined to erect his sumptuous "Folly" elsewhere, with its fountains of gold-work, ivory tables for guests, and so forth. None of this, however, belongs to the newly-exhumed antiquities of the Palatine Hill, though the realities concerning the famous "Golden House" might not be unworthy of an examination by themselves. But, as generations went by, the mania—the malady, Plutarch calls it—of building upon that hill increased, though so little of its monumental glory escaped burial in the earth during a long series of ages—some of it, and the most important, perhaps, even until the present day. The Palace of Domitian, however, still exists, where Nero refused to reside—a vast vestibule, a superb reception-hall, a systematically-arranged series of corridors on either side, a labyrinth of rooms, for various purposes above, and a peristyle in the purest taste. The whole is now open to the gaze of day, with its groups of colossal sculpture, columns of many-coloured stone, and masses of inimitable ornament. Such a new light was not expected, after the exhumation of Pompeii, to be thrown upon the arts and manners of the ancient world; and yet these discoveries date, so to speak, from yesterday.

THE LAST DAYS OF THE PARIS EXHIBITION.—II.

WE glanced last week at the chief awards to the English exhibitors of furniture, pottery, glass, and carpets, and continuing our observations in accordance with the classification in the catalogue, we arrive at Class 22—Paperhangings. The two principal exhibitors of paperhangings—Messrs. Jeffrey and Co., of Islington (some of whose exhibits we hope shortly to illustrate) and Messrs. William Woollams and Co., of Manchester-square—have received—the former a gold medal and the latter one of silver. Messrs. Jeffrey show an interesting and valuable collection of embossed papers, and imitation leather work, for which they obtain an honourable mention in Class 18. They have also supplied the wall paper, and ornamental dados for the jury-house in the central avenue, erected by Mr. W. H. Lascelles. Messrs. John Allan and Son have obtained a bronze medal for a cheaper description of wall papers manufactured by steam machinery only. The juror in the case of paperhangings was Dr. Christopher Dresser. The next class, for steel goods and cutlery, has little interest for our readers. Messrs. Joseph Rodgers and Sons, of Sheffield, carry off the highest award—a gold medal—while their fellow-townsmen, Messrs. Brookes and Crookes, have received a rappel of a gold medal. Mr. F. J. Mappin was the English juror.

Class 24 is headed in the list of awards "Clockmaking," but it should really read "Goldsmith's and silversmith's work." The most prominent exhibitors in this section, Messrs. Elkington and Co., of Birmingham—who have supplied a costly service of plate for the Prince of Wales's pavilion, and have made a splendid display of high-class manufactures—take the principal award—a gold medal. The fact that a New York firm receive a grand prix, while Messrs. Elkington have only a gold medal, has been a subject of much comment at Paris, and the reasons for this preference are somewhat hard to unravel. We believe that the jury considered that more novelty and taste were exhibited in the comparatively small show of the Americans than in the beautiful collection of objects contributed by the English firm. Anyhow the choice of an American rival for the greater honour should have the effect of spurring on their English rivals to increased efforts, for it will never do to allow American manufacturers to outstrip us in the art manufactures in which we have hitherto been pre-eminent, in the same way as they are slowly but surely driving our staple English manufactures of hardware, cotton goods, and machinery from the markets of the Continent. Messrs. Mackey, Cunningham, and Co., of Edinburgh, receive a silver medal for silver plate and jewellery, while there are ten minor awards. Professor Archer, the director of the Edinburgh Museum of Science and Art, was the English juror.

The exhibitors in the following class had not the advantage of a countryman to act as juror, and it seems that considerable difficulty was experienced in deciding in what class some of the objects in metal work should be included. Class 25 is entitled in the catalogue "Bronzes and various Art Castings and Repoussé Work." In the official list of awards we have in lieu of the word "art" iron, and a better plea is thus afforded for accepting the various descriptions of ornamental iron work, some of which are, however, not repoussé work at all, and being "wrought" are certainly not "art castings." The only gold medal to English exhibitors is a rappel to Messrs. Winfield and Co., of Birmingham; four bronze-silver medals are gained by Messrs. J. W. Singer and Son, of Frome, Messrs. Hart, Son and Peard, Messrs. J. Hardman and Co., of Birmingham, and Messrs. Barnard, Bishop and Barnards, of Norwich. Messrs. W. Cubitt and Co., obtain a bronze medal for their gates, but they take a silver medal for them in Class 66. Six other bronze medals are distributed among the exhibitors of metal work.

Class 26, "Clockmaking," did not attract many English exhibitors, perhaps owing to the fact that our countrymen cannot compete with the Continental manufacturers. A gold medal rappel is secured by Mr. Victor Kullberg, of Liverpool-road, London, for chronometers; and silver medals are gained by Sir John Bennett and Mr. Frodsham, of Gracechurch-street. The remaining awards consist of three bronze medals and an honourable mention.

The exhibitors of heating apparatus and processes, Class 27, were represented on the jury by Dr. Angus Smith, F.R.S., and here for the third time Messrs. Winfield obtain the rappel of a gold medal. Mr. William Sugg receives the only other gold medal for his gas apparatus. His name is prominently known in connection with improved arrangements for burning gas and for measuring its illuminating power. Seven exhibitors in this class have gained silver medals. Messrs. Feetham and Co. for warming apparatus, Messrs. Hartley and Sugden for hot-water apparatus, Messrs. S. Leoni and Co. for kitchen ranges, &c., Mr. E. Lumley for hot-water apparatus, Messrs. Musgrave and Co., of Belfast, for improved heating apparatus, Messrs. Redsdale and Co. for ships' lamps, and Messrs. Rosser and Russell for kitchen apparatus. Thirteen bronze medals and honourable mentions complete the distinctions gained in this class by our countrymen. Classes 28 to 38 inclusive contain little of interest to our readers, and we may pass on at once to Class 39, jewellery and precious stones. Mr. J. Brogden secures the only gold medal. Three Scotch firms take silver medals: Mr. J. Aitchison, Messrs. Mackay, Cunningham, and Co., and Messrs. W. Marshall and Co., all of Edinburgh. A fourth silver medal is awarded to Messrs. Francati and Santa Maria, of Hatton-garden, for jet and silver jewellery, and there are ten bronze medals and honourable mentions. Our English juror was Mr. R. Phillips, of Cockspur-street. We may again skip some intermediate classes, and proceed to Class 43, mining industries—raw and manufactured products. In this section England is extremely well represented, and very high honours have been bestowed upon our producers and manufacturers. Thus, in addition to a diploma of honour conferred upon the North of England Iron Manufacturers' Association, we have obtained no fewer than four grand prizes—one to Sir John Brown and Co. for armour plates, a second to Messrs. Cammell and Co. also for armour plates, the third to Messrs. Johnson, Mathey, and Co. for platinum apparatus, and the fourth to Sir Joseph Whitworth for his fluid compressed steel. Twenty gold medals, two of which are rappels, and twenty-six silver medals, one being a rappel, yields too long a list of names for us to go through here. It is somewhat strange among this list to find Messrs. Elkington down for a gold medal for electro-plate, and Messrs. H. H. Vivian and Co. for their nickel goods. Among the honourable mentions we find Messrs. Macdonald, Field, and Co. are down for their granite; while Messrs. Barnard, Bishop, and Barnards take a silver medal for their gates; and Messrs. Boulton and Paul, and Messrs. Hill and Smith have obtained bronze medals for their galvanised iron. The English jurors were Mr. J. Lowthian Bell, M.P., and Professor Warrington Smyth. Classes 45 to 53 inclusive have little concerning our readers; in the latter class, however, Mr. Sugg again takes a gold medal for gas metres, and Messrs. Doulton take a similar medal for fireclay goods, and a bronze medal for crucibles. Class 54 is again one in which English exhibitors make a large show. "Machines and apparatus in general" is a sufficiently wide heading to include any mechanical contrivance, and the objects placed in this class belong to every category of machinery. The two grand prizes are carried off by Messrs. Galloway and Sons, for their engine and boilers, and by Sir J. Whitworth and Co. for steel. It is impossible to go through all the awards in the large machinery classes, but we will endeavour to mention those inventions which seem to have some connection with our special subjects. Mr. V. D. de Michele receives a bronze medal for his useful little machine for testing cement, and Messrs. Kennedy's Patent Water Metre Company have a bronze medal for their metres. In Class 55 (machine tools) the grand prizes go respectively to Mr. R. H. Tweddell for hydraulic machinery, and to Sir Joseph Whitworth's Company for lathes. Passing on to Class 59, which consists of apparatus and processes for manufacture of furniture and objects for dwellings, we find the makers of wood-working, stone-cutting, and brick-making machinery. In the wood machinery Messrs. Alan Ransome and Co., of Chelsea, secure a gold medal for wood-working machinery; gold medals are also awarded to Messrs. T. Robinson and Son, of Rochdale, and to Messrs. S. Worssam and Co., of Chelsea. Silver medals for wood-working machinery are obtained by Messrs. C. Powis and Co., Messrs. F. W. Reynolds and Co., and Messrs. Western and Co. A brick-making machine by Messrs. J. Whitehead and Co. has received a silver medal, and Messrs. Brunton and Trier have been awarded a bronze medal for their stone-cutting machine. We may proceed at once, as our space is limited, to Class 66 (apparatus and processes of civil engineering, public works, and architecture), another

very large and important section, our jurors for which were Professor Fleeming Jenkin and Mr. T. C. Keefer. The only grand prize goes to Messrs. Doulton and Co., for earthenware pipes. The Institution of Civil Engineers has received a diploma of honour for a collection of engineering works, which comprises the entire set of the "Transactions" of the society, a record of the principal works of importance executed since the foundation of the institution. These volumes have been supplemented by a series of photographs, drawings, and diagrams, lent by engineers of eminence. The collection was somewhat hastily formed at the instigation of Professor Jenkin, the juror for this class, when it was discovered that although the British architects had made a very important and comprehensive display, our engineers were wholly unrepresented at Paris. Two of the exhibitors of English houses are rewarded with gold medals—Mr. Lascelles for his red brick front, designed by Mr. Norman Shaw; and Messrs. Collinson and Lock for their old English house. Messrs. Cubitt receive a silver medal for their house and gates. Two of the remaining gold medals in this section are carried off by makers of safes—Messrs. Hobbs, Hart and Co., and Mr. Chatwood. The two other gold medals are both awarded to machinery manufacturers, who obtain minor awards in the classes in which they were at first respectively entered—Messrs. Marsden, who obtained only an honourable mention in Class 50 for their stone-breaker, here have a gold medal for the same machine; and Messrs. Brunton and Trier, who take a silver medal in Class 50, obtain a gold medal in Class 66 for their stone-working machinery. There are 25 silver medals in this class, a large proportion of which are bestowed upon manufacturers who have received awards in other classes, and who appeared to have tried their luck subsequently in Class 66. It seems to have been a common practice for shrewd exhibitors to go out "jury hunting"—that is, to fill up forms for any classes in which they could by any pretext whatever claim to be included, and then induce the jury to come round and view their goods. We believe that several energetic agents succeeded in bringing the objects of one manufacturer under the notice of at least half-a-dozen different juries, from many of which awards were obtained. Mr. G. Jennings, of Stangate, has the only silver medal for "plans and designs." Silver medals for bricks are obtained by the Abernant Ironworks Co.; Messrs. J. Cliff and Sons, of Leeds; Mr. J. Dunnachie, of Glasgow; the Glentoig Fireclay Co.; Mr. J. Hamblet, of West Bromwich; Messrs. Harper and Moores, Mr. G. K. Harrison, and Messrs. King Brothers, all of Stourbridge; Messrs. J. Stiff and Sons, and Messrs. Wood and Ivory, of West Bromwich. Silver medals for Portland cement are awarded to Scott's Sewage Company and Messrs. Francis and Co., Messrs. Macdonald, Field, and Co., and the Peterhead Granite Co. receive silver medals for their granite. Silver medals are also gained by Messrs. Salmon, Barnes, and Co., and Messrs. Clark and Co., for revolving shutters. We cannot go through the remaining awards, some fifty in number, which are certainly most miscellaneous in their character, and range from steam road-rollers to manure.

The only other section which requires notice is Class 85—conservatories. Here we find a gold medal is awarded to Messrs. James Boyd and Son, of Paisley, and silver medals to Messrs. Barnard, Bishop, and Barnards, Messrs. Boulton and Paul, and Mr. J. Caven Fox; while Mr. W. L. Lascelles receives a bronze medal for a very unique curvilinear planthouse, made of pitch pine bent by steam.

ALTERATIONS AT ST. MARY-LE-BOW, CHEAPSIDE.

A REMARKABLE amount of zeal—not always according to knowledge—has been manifested lately to protect our old City churches from destruction or wanton alteration, and the *Times* of Thursday last, following some of its other equally well-informed contemporaries, protests strongly against the alterations which have been lately commenced at the celebrated Church of St. Mary-le-Bow, Cheapside. The writer of the article is rather hasty in his conclusions, but at any rate he has sounded the note of alarm loudly enough. We are informed that the old church of Wren is now threatened, and in imminent danger. The base of the steeple "is already encased with a portentous scaffolding, which seems to indicate something more than mere repair," while with regard to the interior a correspondent in the same number of the *Times* enumerates a startling list of changes which may well have alarmed people who knew little more about the matter than he does himself. This letter, which has been made the text of the *Times* article, is contributed by Mr. D'A. Beddingfeld Collyer, and the following alterations are those complained of:—"Re-arrangement of the east end of the church by forming proper stalls for the clergy and choir; the improvement of the interior by a judicious system of coloured decoration; the lowering of the floor of the main body of the church, so as to form a raised chancel, and the inclosure of the chancel by a dwarf wall or railing; the removal of the whole of the present seats in the church, which are to be replaced by others of suitable design in oak or pitch pine; the remodelling of the reredos or the substitution of a new one of approved design; the removal and re-erection in more convenient places of certain monuments." These are the changes which have aroused the wrath of Mr. Collyer and the thunder of the *Times*. Fortunately we had no sooner read the article and letter than we remembered that so conscientious and moderate a restorer as Mr. Blomfield had been entrusted with the work, and after a visit to the building our conviction is confirmed, in spite of the *Times* and its correspondent, that Wren's famous church could not be in safer hands. As to the outer scaffolding, the "portentousness" of which has alarmed our contemporary, we hasten to assure it that Wren's celebrated steeple is really in no danger; not the slightest structural alteration has been or will be made, the fact being that the tower has been simply repaired in a few places, decayed and dangerous stones having been secured or replaced—in short, the work has been one of absolute necessity to preserve the structure from the effects of sheer neglect. We may just observe here that some years ago the charming peristyle was found to need strengthening, and some iron ties were introduced. Towers of stone especially are subject to decay from atmospheric influences tending to render them insecure, if not dangerous to passengers, and a timely and thorough repair is periodically called for in the way of reinstating weak and loose stones, and replacing corroded cramps.

As to the interior alterations, we cannot see that the arrangements to be carried out at Bow Church will exceed the absolute demands of moderate ritual and convenience. A church should, in our opinion, be maintained as a church for as many generations as possible, and every age requires it to be preserved in as tolerably a decent state for that purpose as practicable. Even the writer in the *Times* admits that each generation must deal with a building, as Wren added to Westminster Abbey, or Inigo Jones stuck on a colonnade to Old St. Paul's. We were, as a matter of fact, surprised to see, when we entered the building, how little had been done. There is no structural interference with the walls or roof, the only important change contemplated being the substitution of good and substantial seats for those which were erected in 1867, when the old sleeping boxes were cleared away, and which, on account of want of funds, were altogether unsuitable and inadequate, and the lowering of the floor of the body of the church about one step or 10in. The last-named alteration accomplishes two things at once: it takes away a step at the entrance, which no one can complain of, and it raises the chancel one step above the main floor. This probably is what the writer means by "meeting the prevalent Ritualistic taste." If so, all we can say is that instead of harm or spoliation a service has been rendered which Wren himself would have gladly admitted if he had been allowed by the ultra-Protestantism of his age, which despoiled and pared down some of his best works—even St. Paul's itself. The *Times* leader-writer and correspondent were both probably unaware that the flooring of Bow Church originally sloped gradually from east to west; but in 1867, in consequence of this not being perceived in time by the architect who had charge of the work, the floor at the west end had to be raised six inches or more to avoid an inconvenient step into the seats. The re-arrangement of the east end will consist of the orderly placing of stalls at each side of the "communion table" for the use of clergy and choir, and the removal of the pulpit and reading-desk from the immediate proximity of the altar railing to positions a little further in the church, better in every respect for sight and sound. The pulpit is a very interesting carved oak one, the capping and side panels being enriched by some very spirited carving of foliage in high relief. The lion and unicorn are carved in the hollow of the cornice on each side, and the pulpit stands on a well-designed, moulded base, octagon in form. We think its intended position near the north-eastern pier will be a great improvement. The new seating will be of pitch pine, and the few benches we saw are designed strictly in keeping with the Classic style of the church, the panelled backs and cappings and square ends being moulded to accord with the old work. The seating is intended to be confined to the central area, which includes the four main piers; these will stand within the line of seating, the narrow side aisles being paved as passages, together with a central passage way through the body of the church. The paving is of tiles in small diagonal squares, of a very simple and effective pattern, the colours being subdued, and consist mainly of white and black diagonals, with buff tiles used moderately in the centres. The eastern or raised end is of bolder design with large squares disposed rectilinearly, light-blue borders being introduced with the black and buff. We have one objection to make—if what we are informed is correct—and that is with regard to the removal of the old oak reredos under the east window, which we rather think will give those inclined to be contentious some ground for the remark that antiquarian eclecticism or fashionable ritual has something to do with the alteration. This objection, to our mind, is intensified if the reredos is to be removed from the altar, and readapted as a screen to the western doorway. We trust such a change will be reconsidered. It is not the beauty of the design of the old reredos we have in view, as it is certainly less interesting than the carved reredos we referred to the other day at St. James's Church, Piccadilly, and the front is only relieved by coupled pilasters of the Corinthian order; but it is neverthe-

less characteristic and as such we should e sorry to see it disturbed.

Another and more excellent example of framed woodwork occurs at the main northern entrance from the tower, which forms a screen in the semicircular opening. The pilasters, carving, and entablature of the door are very correct and pleasing, and the outer wooden porch in the vestibule leading to vestry is another remarkable and valuable specimen of carved woodwork, probably little known to connoisseurs of eighteenth century architecture, and we hope these will not be touched. We see the screen was erected in 1716.

For the information of those not acquainted with the interior of this fine edifice, it may be necessary to recall the chief points of the plan. This is nearly a square, the length from east to west being about 70ft., and the width between the walls about 60ft. The area is divided by only four piers consisting of square pilasters, combined with three-quarter columns of the Corinthian order, into two aisles and a central nave, the latter of which is one of the boldest and finest to be seen in Wren's basilican churches. With the exception of the four piers carrying an elliptical vault over the nave, and lower cross vaults over the aisles, the space is entirely unobstructed, and by the new seating arrangement there will not be a single occupant of the seats who cannot see the pulpit. There are no galleries, and another point of interest is that the lighting is cleverly managed by dormer windows which pierce the main ceiling, three on each side (over each bay) by end semicircular windows, and by circular windows in the bays. The ceiling is panelled in Wren's usual manner: ribs, with pateræ, spring from the entablature over each Corinthian column, and divide the ceiling into three unequal divisions; but it must be noticed the centre bays between the piers are the widest, and are arched with elliptical arches, the end bays having circular arches. Longitudinal beams, which run into the ribs, divide each compartment into three panels, the upper centre one being much the widest, and these beams are richly decorated with a foliage centre in high relief. The end walls of the nave are cleverly managed, the main order returning with single Corinthian columns on each side of the middle windows. We may add that a few very fine stained-glass windows adorn the west end and the aisles, the east window being plain. That at the west end is an extremely pleasing window, composed entirely of conventional foliage, with three centre panels, and with wide and handsome borders. The centre foliage is of a deep red, the ground and borders green. The colours are particularly soft, and the design in excellent taste. It is proposed, we hear, to decorate the interior in plain colours, and to paint the stone columns with their imposts—a change, we think, no one can object to, who knows anything at all of Wren's interior decoration. At present the ceiling and panels are lost in a dingy drab, and a little colour and judicious gilding in the capitals, and enrichments of ceiling would vastly lighten the interior effect. The writer in the *Times* refers to the old basilican churches of the Continent, and talks of the horror with which any alteration of their arrangement would be regarded. He says the taste may yet revive for such arrangements as those which the unrestored City churches present. Perhaps so. In all probability we think it will, but these assertions clearly show us that the *Times* has fallen into the error of supposing that Bow Church is to be reconstructed or remodelled, and its essential character changed.

Now, such a change would be impossible without pulling down and altering the position of the pillars, the roof, and the eastern end entirely. The present case is simply one of re-seating and decoration—processes naturally necessitated by the mere lapse of time. We have no wish to dispute the proposition that a vulgar passion for mere newness is one of the most depressing signs of the time; but we object, as a matter of fair play, to the use thereof as a text for a homily altogether out of season. If there is one thing for which Mr. Blomfield has gained a well-founded reputation it is for his carefulness in restoration, and for the marked capacity he has displayed for entering into the aims and spirit of those who built the structures which he has been called on to preserve; and it might have been expected that even the *Times* would have taken the trouble to find out what he was really going to do before finding fault foolishly.

UNDERGROUND WATERS.

A VERY valuable inquiry into the sources of our water supply has been instituted by a committee of the British Association for the Advancement of Science, and we have now before us the third report. The committee's investigations have been mainly directed to the circulation of underground waters in the new red sandstone and Permian formations of England, and to the quantity and character of the water supplied to various towns and districts from these formations. We observe among the committee the names of Professor E. Hull, C. E. de Rancé, S. Mellard Reade, Capt. D. Galton, Professor Prestwich, and other authorities. The results are proposed to be laid before the next meeting of the association, and we may refer to them as of special interest at this time. Besides the circular form of inquiry, which the committee say has only furnished information as to local areas already known, personal examination of the districts has been made. Referring to the Rivers Pollution Commissioners the classification of wholesome and palatable waters is given as follows:—Wholesome waters are (1) spring water; (2) deep-well water—both very palatable, and (3) upland surface water, moderately so. Those classified as suspicious are stored rain water and surface water from cultivated land; while under the denomination "dangerous" are river water, sewage-tainted and shallow-well water—the last three sources being bracketted "palatable." The committee, speaking of spring and deep-well water, strongly advocate their utilisation and conservation, and recommend the association to make it a matter of inquiry. As one demanding imperial legislation we fully concur.

The comparative amount of hardness of the water of the deep wells of the new red sandstone, and the relation of hardness to the rate of mortality, are first referred to. The average amount of hardness fixed by the commissioners of the deep-well water is 17·9°, and of the springs from the same formation 18·8°. It appears from the tables given that the average death-rate is greater in towns supplied with soft water than in those supplied with drinking water of harder quality; thus in 26 towns, where the water does not exceed 5° of hardness, the average death-rate per 1,000 per annum was 29·1; in 25 towns where the water is more than 5°, but not exceeding 10° of hardness, the average was 28·3; while in 60 towns drinking water of more than 10° of hardness the average was only 24·3. It is also observed—and is a point of considerable significance, we think—that the lowest death-rate is found to occur in those towns supplied with new red sandstone water. A similar result is found to obtain if towns of corresponding populations and occupations, supplied from surface areas with soft water, and those from deep wells in this formation, are compared. Thus Manchester, with 351,189 inhabitants, has an average death-rate of 32 per 1,000, while Birmingham, with 343,787, has only 24·4; and it is pointed out by the report as worthy of note that the five inland manufacturing towns—Birmingham, Leicester, Nottingham, Stoke-on-Trent, and Wolverhampton—all supplied with hard water from the new red sandstone, have the lowest death-rate. Again the twelve inland non-manufacturing towns, supplied with soft water, have a death-rate of 26 per 1,000 as against twenty similar towns supplied with hard water, where the death-rate was only 23·2. The report says, "When, however, the mortalities of the districts including the principal English watering-places are compared, there appears to be little variation in the death-rate, whether the population be supplied with soft, moderately hard, or hard water, so that it may be safely concluded that where sanitary conditions prevail with equal uniformity, the rate of mortality is practically uninfluenced by the degree of hardness of the water used"—a conclusion agreeing with that of the Rivers Pollution Commission. We pass over that part of the report referring to the water supply from the Permian rocks and the different types, upon which the committee have not been able to obtain much information. It appears that not less than 10,000 square miles are occupied in England and Wales by the new red sandstone and Permian formations, and that these absorb not less than 10 inches of rainfall annually. Shallow wells abound in this area, and the sandstone and overlying drift form an excellent water-bearing stratum, but the report says the numerous sources of pollution render them valueless for domestic supply. These wells are charged with organic matter, in some cases amounting to 240 parts per 100,000, being largely impregnated from sewers and cesspools. We have the unpleasant fact recorded that at least twelve millions of the British population obtain their water supply from shallow wells dug in porous soil, which receive the soakage of cesspools. Another very important inquiry the committee intend to prosecute is the question of how far the general level of the springs of the country has been reduced by agricultural drainage, and the question of cutting off the available rainfall by means of intercepting drains is another they intend to investigate. We are glad to find that the committee comment upon the short-sighted policy of the Local Government Board, which merely concerns itself with the practicability of any proposed scheme to obtain water without exercising any control as to how any such proposal made by one town may interfere with another district not represented. This is a point to which we have called attention and which must be dealt with speedily in the competition for the possession of water-bearing areas near crowded towns. The committee regret that the new red sandstone and Permian formations should be so systematically disregarded, especially as they yield an inexhaustible supply of pure water, and that urban districts, like Pemberton and Ashton-in-Makerfield, should have instead obtained powers to collect the surface waters from cultivated land. The report further states that the supply of new red sandstone water, east of Ashton and Golborne, may possibly be made available for the additional supply of Liverpool; and it thinks the inquiry should be extended to include the oolites which are proved to contain a vast supply of pure water. In conclusion, the report says that the result of their labours has been to prove that there is an available daily supply of water from the new red sandstone and Permian beds of not less than 3,600 million

gallons of water, remarkably free from organic impurity. We must say a word or two about another valuable contribution to the committee's report—"On the South Lancashire Wells," by Mr. S. Mellard Reade, C.E., one of the members of the committee. Mr. Reade's deductions will be found of great interest to all students of hydrogeology, and his sections of wells given in the report show the extreme variation of water level in each well produced by pumping. Liverpool, Birkenhead, and Widnes form the three centres about which the most important wells are grouped. In the Widnes wells the section shows a permanent lowering of the water level about 8ft. below the surface on the average, and it is certain that a system of wells permanently lowers the water level. As to the effect of local rains, Mr. Reade states it is undistinguishable; as to the mode of circulation of underground waters the inferences from observations indicate the gradual absorption of the rain water at the surface, and its percolation to underground fissures, by which it is drawn off at the well. Mr. Reade thinks the rock forms a large filter, with veins and ramifications extending in various directions, which enable us to tap and draw off the supply. He combats the theories of Mr. Joseph Boult and Mr. Robert Bostock, which contend that the source of supply is not derived from surface percolation, and account for it by decomposition of sea-water through the rock, &c.; and he believes that rivers having their sources in other strata where rainfall is greater contribute their quota. Mr. Reade affirms that if the absorption be 10in., a circle having a radius of 1½ mile from the well would be sufficient to keep up a supply of 3 million gallons per diem. The facts brought forward lend countenance to the fissure-circulating theory, but we believe much more extensive data must be furnished and tabulated before the underground supply of water can be counted upon, and before we can rely upon the operations of boring or the underground water storage of any given district.

OUR COMMONPLACE COLUMN.

EBONY.

A remarkably hard, heavy, and black wood. It is the heart-wood of different species of *Diospyros*, the same genus which produces the date-plum. The best for uniformity of colour is the *D. Ebenum*, which grows in the flat parts of Ceylon. Ebony has been extensively used in inlaying, and we refer to the Dutch, French, and Italian marquetry for examples of its use.

"ECCE HOMO,"

Latin, "Behold the man," a name applied to representations of Christ crowned with thorns. Some of the greatest efforts of painters have been spent in this embodiment of our Saviour. Correggio's "Ecce Homo," in the National Gallery, is one of the finest works of the kind. See Dr. Waagen's "Art and Artists."

ECCLESIOLOGY.

We refer our readers to the "Handbook of the Ecclesiological Society," Walcott's "Sacred Archæology," and Parker's "Glossary" for information upon ecclesiological subjects. Mr. Walcott's articles on "Conventual Establishments," in the BUILDING NEWS, may be consulted; also Messrs. Audsley's "Dictionary of Architecture," and Lee's "Dictionary of Liturgical Terms."

ELECTRIC LIGHTING.

Sir Humphry Davy first discovered the electric light, and the simplest mode of producing it consists in bringing together the ends of two wires forming the poles of a powerful galvanic battery. Various forms of carbon are generally used, such as baked carbon and others chemically prepared. Many inventions have been introduced for the purpose of maintaining the steadiness of the light, the principal aim being to keep the carbon points within a certain distance of each other by some mechanical means, so that the current can pass between the points. Foucault, Duboscq, Hart, Jablochkoff, and others constructed appliances for this purpose. Before the electric light can be adopted for lighting houses the subdivision of the light is necessary. This is reported to have been accomplished by Mr. Edison and others lately, and there is no doubt that the light can be subdivided to a certain extent. Mr. Edison, it is asserted, has succeeded in dispensing with the ordinary apparatus, and is enabled to render substances incandescent. For particulars we refer to article on "Electric Lighting," BUILDING NEWS, Vol. XXXV.; also Mr. W. Haywood's report on p. 420 *ante*.

ELIZABETHAN ARCHITECTURE.

This style resulted from the importation into England of Continental fashions, and was the earliest stage in that blending of Classic with Tudor Gothic which progressed during two centuries and ended with the utter decadence of art during the Georgian era. As its name indicates, the style was in its greatest purity during the reign of the "Virgin Queen," but though it is easy to mark its introduction, it is almost impossible to trace the exact point at which it merged into the more formal Jacobean. Upon the Tudor panelling and mullions of the last Tudor period were engrafted the orders, volutes, scrolls, and pyramids, frets and fancies revived from Roman precedent through the French and Italian Renaissance. Symmetry was more observed, and strict proportions were relieved by a profusion of applied ornament. The style was very partial in application—the dissolution of monastic establishments and the progress of Erastianism had almost stayed the progress of ecclesiastical architecture. But very few churches were built, and the alterations were often of the meanest type of patching-up. The monuments to the wealthy were, however, very ornate, and often adorned with sculptured effigies and rows of stiffly-quaint children, with painting, gilding, and a profusion of marbles. Good examples are the Spenser memorials at Great Brington Church, those to the Royal House of York at Fotheringhay, in same county of Northants, and those in Westminster Abbey. The chief features of the Elizabethan period were the mansions of the nobility and the half-timbered dwellings of the upper middle classes. No longer fortified, the great houses are arranged round inner courts, with the principal apartments directed outwards. The windows are embayed and mullioned, and occupy a lion's share of the frontages. Gables are carried up at intervals, and the chimney stacks are coupled or grouped in masses of three or four, frequently ornamented on the surfaces, and have moulded caps. The staircases are made more prominent than had previously been attempted, and are arranged in short flights, with carved and panelled newels. The rooms are still very low, but the ceilings are plastered and the walls wainscoted. The formality and profuseness of decoration extend to the gardens. The best examples of this class of building are "Burghley House by Stamford Town," the work of John Thorpe, Hatfield House, Westwood, Warwickshire, and parts of Longford Castle; the Public Schools at Oxford and parts of Wadham and Merton Colleges may also be mentioned. Amongst the smaller examples are many almshouses and hospitals. (See Professor E. M. Barry's lecture in the BUILDING NEWS for March 1st, 1878, p. 224, last Vol.) No reference to Elizabethan architecture could be complete without an allusion to the revival of five-and-twenty years ago, which has left its mark on the land in many hospitals, grammar schools, and other public and private buildings erected chiefly in the provinces during its short reign. The style favoured the employment of brick, and some of the earliest examples are built in that material.—E. WM. P.

"J. A." writes as follows:—In this style of architecture the orders are usually applied only to parts of a front. For instance, the centre, which is marked out as a lofty frontispiece or portal, ornamented with several tiers of columns, and this not only distinguished from the rest, but in many instances rendered quite distinct from it—all besides being comparatively genuine Tudor, without any mixture of foreign elements. Although square-headed and without any tracery of any kind, the windows retain a good deal of the latest Gothic or Perpendicular character, being divided by mullions and transoms into numerous compartments, after the manner of panelling—a mode that freely admits of a window being made of any extent. And not only are single windows sometimes exceedingly spacious, but are put so closely together as to render the whole of a front nearly all window. The most remarkable characteristic of the style is the gable, a feature singularly diversified. Almost all imaginable combinations of curves (convex or concave), with straight lines and angles, are to be met with in these gables. Differently shaped gables often occur in the same building, and produce very great effect of outline, which is further increased by embellished parapets with balls and other ornaments upon them, by small domes or turrets, and by chimney shafts, all which, mingled together, often give an air of picturesque magnificence to what are otherwise rather plain structures, and impart animation to what might else be ungainly masses. In like manner porches and balustraded terraces often give character to the lower part of the building, while the upper may be comparatively uninteresting. The style is exceedingly well adapted for brick and stone, such contrasts of colour seeming natural to it, and serving to bring out the several parts more distinctly. There are also many instances of brick alone being employed, the ornamental members being formed of moulded brick, and the effect produced may be sombre, yet it is by no means unpleasing. To the internal characteristics of the Elizabethan style belong spacious bay windows, long and ample galleries, generally of low proportions; massive and elaborately sculptured chimney-pieces; screens of similar character, either with open arches or doors; wainscoted and panelled walls, the ribs and other ornamentations being of large proportions, bold, and well-defined; ceilings highly enriched, sometimes arched, and covered with scroll-work foliage; wide staircases with large richly-carved balustrades. The prevailing character is that of heaviness and stateliness, on which account it is ill suited for literal imitation at the present day. (See Richardson's examples.)

ELM.

Of the genus *Ulmus*. The most important species is the English elm, *U. campestris*, which has ovate and serrated leaves; wood hard, compact, and durable in water. The weight of elm per cubic foot is stated to be about 42lb. average. Its strength compared with oak is as 82 to 100. If kept constantly wet, as in submarine foundations, elm will last for centuries. Thus the piles on which London-bridge stands are of elm. For other purposes it is little used by the builder.

EMBANKMENT.

The best embanking *materials* are those with the greatest frictional stability, and Rankine states them to be shivers of rock, shingle, gravel, and clean sand. When well drained, clay also forms safe embankments. The worst materials are wet clay, vegetable mould, peat, and some kinds of sand. The same authority enumerates three ways of forming embankments:—1st. *In one layer:* This is the quickest and cheapest method, earth waggons being run out on temporary rails along the top, and tipping the stuff at the end over the sloping bank. Every "tip" thus forms a single oblique layer. 2nd. *In thick layers:* This is a series of single tip processes, allowing each layer to settle before the second is made. 3rd. *In thin layers:* This consists in spreading the earth in horizontal layers of from 9in. to 18in. deep, and ramming each layer before the next is laid. It is a tedious process, and is used only in filling behind retaining walls, wings, and bridge abutments, and in reservoir embankments.

EMBROIDERY

Is an art coeval with the earliest woollen manufacture, and was first practised among the Orientals, by whom it was carried to perfection. It consists in producing needlework patterns upon various fabrics. The Chinese are the most elaborate embroiderers of modern times, and their best work is upon silk; gold and silver thread is much employed. The Persians, Turks, and Hindoos excel in the art of embroidery. Tapestry is a kind of embroidery done with the shuttle, though formerly with the needle. In hand-work the fabric is gene-

rally stretched upon a frame, the design being drawn upon the fabric; sometimes the design can be traced. Berlin work is done by following the design on a paper pattern marked with lines to represent the threads. See the "Art Handbooks," South Kensington Museum.

ENCAUSTIC TILES.

"J. A." sends the following:—Encaustic tiles are of two kinds—plain and figured. The first are of different colours, and square or triangular, forming a mosaic when laid. They are made by placing the clay in strong moulds and putting on it such a pressure that 3in. of powdered clay is compressed into a tile of 1in. in thickness. They are then baked, fired, and glazed. In making figured tiles cubical blocks of well-tempered moist clay are first used. These are cut into square slabs by wire, then faced with a finer clay of the required colour, and put into a box-press or mould; a plaster of Paris slab containing the pattern in relief is then brought down upon the face of the tile, and the design impressed into the soft clay. The hollows thus formed are filled with semi-fluid clay of the requisite colour to form the pattern poured into them, and over the whole surface of the tile. It is then set aside till sufficiently hard and dry to have its surface cut down so as expose the pattern and the ground, the two colours of clay then forming one smooth flat surface. The tile is then dried and fired.

ENTASIS.

A delicate swelling applied to the shaft of columns by the Greek architects, to correct the appearance of concavity they would otherwise present. Vitruvius alludes to this refinement in his third book. The entasis of the Greek columns has been investigated by Professor Cockerell, Mr. Penrose, and others, but it was first noticed by Mr. Allason. The convex outline given to columns by the ancients is observed in those of the Parthenon to be that of a conic section (hyperbola), and the swelling is so imperceptible as not to be noticed in viewing the columns. In the Parthenon it is 1-550th of height. The straight lines of spires and shafts always have a weak effect if a slight convexity is not given to the contour. (See articles in BUILDING NEWS on "Optical Correction in Design").

"W. W." writes:—Entasis is a slight swelling in the outline of the shafts of nearly all Greek columns, specially to be observed in the Doric order, just sufficient to counteract and correct the optical illusion of curvature in a concave direction, which might else take place in the middle of the shaft, and cause it to appear thinner than it really is. The entasis is not intended to show itself, and commences at about one-third of the height of the column, and then diminishes to the top.

"C. P. E." sends a note, in which he refers to Mr. Penrose's paper on the curved lines of the Parthenon, read at the R.I.B.A. on 23rd of February, 1846.

EURITHMY.

"C. F. N." writes:—Eurithmy (εὔρυθμος, in good measure, rhythmical) is a series or flow of the same ornament, broken here and there by some prominent feature. Thus, a row of railings, divided at certain spaces by standards. Eurithmy in art is the rhythm of a verse which is broken by a cæsura, which cannot perhaps be better illustrated than by the following well-known verse—

Arma virumque cano. | Trojae qui primus ab oris.

[A better illustration of this quality in architecture is the façade of a building in which the solids and openings are pleasingly intermixed.]

THE DRAINAGE OF LAKE FUCINO.

THE opening lecture to the class of Civil Engineering at the University of Edinburgh was given by Professor Fleeming Jenkin, on Monday. The Professor gave an account of the great project for draining Lake Fucino in Italy, which, commenced 2,000 years ago, had at last been successfully accomplished. The lake was situated in the Abruzzi province, 53 miles east of Rome, and covered the greater part of a large table land near the small town of Avezzano. The surface of the water was 2,094ft. above the sea, but to the lake there was no natural outlet; and though the action of the wind on the water prevented it from stagnating, the neighbourhood of the lake was very unhealthy. Whenever there was a succession of years in which the rainfall was heavy the lake rose enormously, and covered the adjoining country. The nearest river was the Liris, 3¾ miles away, but the mountain Salviano and a high plain separated the two. The comparisons between what the lake was recently and what it had been in ancient times were extremely curious, as showing the changes which took place in the rainfall over a long cycle of years. Between 1783 and 1816 the lake rose 30ft. 5in., and was then 74ft. deep. From the commencement of 1820 to 1835 it fell to nearly 11ft. below its level in 1783, being then 31ft. deep. In 1861 it had risen again 30ft. The remains of drainage works on the lake showed that its area was about the same in 1816 as it was in the reign of Julius Cæsar or the Emperor Claudius; though there was evidence that it had risen much higher in prehistoric times. The average extent of the lake was 33,050 acres. It was 12·4 miles long and 6·8 miles broad. The Italian engineers calculated that the lake had been silting up at the rate of 12in. per century—and that was an interesting geographical fact, as showing the rate at which these large lakes silted—so that the present bottom was 15ft. higher than it was in the reign of the Emperor Claudius. Julius Cæsar had conceived the utility of draining the lake for the sake of the health of the district, and also with the view of increasing the corn-growing area near Rome; but his death put an end to the scheme. In the reign of Claudius the project was again revived, and the favourite Narcissus was ordered to go on with the necessary works at the public expense. Suetonius stated that for eleven years 30,000 men were employed there, and the elder Pliny said that the works were so extraordinary that no language could give any idea of them. These works consisted in boring a tunnel under Mount Salviano, 984ft. below its summit, and under the Palentine fields at an average depth of 328ft., to discharge into the river Liris the surplus water of the lake. The construction of a tunnel of about 4 miles in length at a great depth under a mountain was, in the then state of engineering science, a wonderful undertaking. It would not be an easy job now. The tunnel actually was made, and the lake partially drained; and it appeared from the remains of the old tunnel that the original engineer understood his work extremely well, but that the designs were imperfectly carried out, and the work shockingly scamped by the contractor. First of all levels could not have been well understood in those days; nevertheless, the outfall had been most correctly chosen, so as to give the reasonable fall to the water of 1½ in 1,000; the new outlet at the river Liris was within a foot or two, and at the same level as that chosen by the Roman engineer, and the Roman engineer had also selected the direction of the tunnel very properly, and had followed so correctly the configuration of the ground in making it that the modern engineers had not been able to improve upon it. The old shafts—40 in number—which had been sunk so that headings might be driven in various directions at one and the same time, had been well constructed, and had been largely taken advantage of in constructing the modern tunnel. A great difficulty the Romans must have encountered was the quantity of water which flowed from the strata; and how they got over it was not easy to say, as it was not known that they had pumps sufficient to cope with large accumulations of water. One of the most curious things about the old tunnel was the constant variation of the cross sections. Beginning with a finely-arched entrance, the tunnel as it went into the hill got smaller and smaller, just as the men got tired of the work, until in the centre there was only a hole large enough for a man to creep through. Then it opened out again towards the outfall. Where it could be inspected, it was all right, but what was altogether out of sight had been scamped in the way indicated. During the progress of the work a great slip had occurred; and evidently, as they could not get through the loose earth, the workmen turned off to the right and made a curved gallery through the stone some 400ft. in length round the obstructing mass. The tunnel was opened by Claudius, who first of all witnessed a sanguinary sham sea-fight on the lake, in which the convicts gathered from all parts of Italy were made to destroy each other. The tunnel, however, soon got blocked, and it was not until Hadrian's time that it was put right. The lake was then reduced to some 17,000 acres. The entrance to the tunnel seemed to have been kept in good order down to the 5th century, but with the fall of the Roman Empire the tunnel was abandoned and the lake resumed its ancient extent. Various abortive attempts were afterwards made to open the tunnel from time to time. In 1851 a company, with a capital of £200,000, was formed for draining the lake—the concession they were to get in return being land which was reclaimed; but this enterprise, too, fell through. Prince Alexander Torlonia, who held half the shares in the concern, however, bought up the other half, and having obtained the repeal of some objectionable clauses in the concession, proceeded with the work. He consulted a French engineer, Franz Mayu de Monsucher, under whose direction a tunnel following the line of the old one for carrying off 11,000 gallons of water per minute from the lake was completed in June, 1875. The cost had been 1¾ million sterling. The lake had now been completely drained, Torlonia had got an estate of 35,000 acres, the neighbourhood was now healthy, and the general prosperity which had been brought about to the population by this great work had been most marked.

RAILROAD CURVES.

AN elaborate investigation into the resistance offered by curved railway tracks to trains is the subject of a paper read before the American Society of Civil Engineers by Mr. S. Whinery, C.E. The author commences by alluding to the unsatisfactory efforts made to determine the amount of resistance experimentally, and believes that intelligent theory is necessary to assist the experimenter as well as the inventor in devising means to surmount the elements of resistance. We cannot here enter into the numerical formulæ, but we may give what appears to be the general gist of the author's paper. A railway car with cylindrical wheels of the same diameter moves along a straight and level track without being subject to lateral movement, the only force acting being that of gravity; but if the direction is changed by a curved track the centrifugal force, besides the tractive and gravitating, is called into play, usually expressed by the well-known formula—centl. force = $W \frac{V^2}{32{\cdot}2R}$ where W equals weight of moving body, V the velocity in feet per second, and R the radius of curve in feet. The resultant of the force of gravity and the centrifugal force acting horizontally outwards from the centre of curve is represented in direction and amount by the diagonal of a rectangle, of which one side equals the force of gravity, and the other the centrifugal force, and the action of this resultant tends to press the wheels against the outer rail. To counteract this tendency the plane of the rails may be inclined so as to be perpendicular to the resultant. The author gives a value for this in a table for varying curves and speeds, found by formula for super-elevation (or $E = g \sin. a$), putting for g the distance from centres of rails = 4·896ft., and not that of the gauge of track, which he says is erroneous. When a train glides round a curve of 12° at the rate of 90 miles per hour, the common formula requires for a track of 4·7ft. gauge a super-elevation of outer rail of more than 5ft.—a requirement that is sorely puzzling. Again, it is the practice to super-elevate the outer rail above the general track. This is thought doubtful, and the author says if the support of the inner wheel is depressed, the moment a car strikes the curved track the two forces are neutralised. The super-elevation of the outer rail, he says, also materially increases the steepness of the gradient at that point. The author observes, of a circular curve that there is a difficulty in securing the difference of elevation of the rails at the proper time, and this difficulty he suggests may be overcome by "beginning and ending the curve with a parabola, whose radius be-

ginning infinitely great, shall become equal to the radius of circle into which it merges." The change in level would thus begin with the beginning of the curve, increasing till its maximum was reached at the commencement of the circle. Mr. Whinery predicts that when fabulous train speeds are adopted, all curves will begin and end with the parabola. The author refers to the coning of the wheels, and to the tendency of opinion amongst engineers to reduce the coning to a very small quantity, if not to do away with coned wheels entirely. We cannot follow him into the minute investigation of the movement of coned wheels, and the combined effect of the centrifugal and tractive forces upon them, but he concludes "that the coned wheels of a car will adjust themselves to any curve whose radius is not less than the altitude of the cone, of which the wheels in the position of the greatest difference of diameter form a frustum." The author believes also that the coning of wheels not only does not diminish the train resistance on curves, but that it increases the resistance on straight lines: in fact the writer thinks the notion entertained by many that the violent oscillations noticed on railways is largely attributable to the use of coned wheels to be correct. As Mr. Whinery says, the question is one to be settled by observation and experiment rather than by analytical investigation. If the conclusions he has drawn are correct, the coned wheel becomes a refinement of no value. The table given by the author, showing curve resistances for passenger trains on curves of various degrees, will be found of interest to all railway engineers, and the conclusions follow from it—1st. Resistance is very nearly in inverse ratio to the radius of the curve, or directly as the degree of curvature. 2nd. It varies directly as the weight of car. 3rd. It is almost independent of velocity; and, 4th, other things being equal, a short car causes slightly less resistance than a long one. It would appear then that car-tracks are better short than long, and the American 8-wheeled car with "bogie" trucks has advantage over the long 4-wheeled car with long wheel base. These views we may say are completely at variance with the conventional rules of the engineer, but the arguments of the author commend themselves to us.

EXHIBITION OF BOARD SCHOOL DRAWINGS.

THE exhibition of drawings by scholars and pupil teachers of the various Board Schools in London, on view at the Saffron-hill Board School, Farringdon-road, exhibits certainly in numbers if not in merit, a falling off from that of last year. We then remarked upon the indiscriminate instruction given in drawing, the want of method in placing the proper subject before the students, and the consequent misdirection of ability. While an evident improvement is noticeable as regards these points, there is still much room for reform. We still see a sprinkling of the usual subjects—copies of prints, flowers, landscapes, heads, and imaginative compositions, many showing unmistakable evidence of inborn talent and painstaking labour, but still subjects of a kind unsuited to train the eye and hand. It would be as easy to supply the right kind of studies and models for pupils of different capacities as the wrong, while the labours of the masters and mistresses would be reduced and surer progress made. In the last collection we saw numerous representations and portraits of Wellington, Napoleon Bonaparte, Garibaldi, the Prince of Wales, and other distinguished personages, but we are glad to find this year no single instance of this miserable and perverted kind of art instinct. Still there are a few pencil, chalk, and water colour subjects with moated castles, bridges, and mountains, the objects being drawn in anything but perpendicular positions, and the colours and shadows of the crudest kind. There are also too many representations of shaded flowers to please us, and we trust next time to see a still further amendment made.

Looking over the exhibits some schools stand conspicuously higher than others. Finsbury, Southwark, Hackney, Lambeth, Tower Hamlets, and Greenwich stand well. Beginning with Tower Hamlets division, Old Ford school sends some interesting evidences of juvenile art talent. One of the pencil outlines represents an original carpet pattern by a pupil aged 13, in which there is a germ of invention. The coloured sketches and natural flowers are ambitious, but we cannot say more. A neatly drawn arabesque comes from the Upper North-street school, and the Burdett-road school exhibits some mechanical drawing. Lambeth is very largely represented. We notice from the Clapham school a drawing in chalk of St. George and the Dragon, the labour in which would have been better spent in outline drawing. Florence Russell, from the New-road school, exhibits good outlines. Another, Rose Russell, of the Larkhall-lane, shows some excellent outline ornament flat; so does H. Spurr, of Clapham school. From the Lower Park-road school we see some well-drawn heads in chalk from the round, by F. Bird. The Canterbury-road (boys), Westmoreland-road, Albany-row, and Lower Park-road schools contribute specimens of skill, many of merit; the chalk landscapes from the Albany-row school display talent that might have been more usefully employed. Haverstock-hill Board School, Marylebone, is represented by a few good outlines from the flat, and geometrical drawing. Hackney, as usual, is not backward. Maidstone-street, Gainsboro'-road, London Fields, Wilmot-street (girls), and Twin-street schools, exhibit several meritorious drawings. We note more especially Wilmot school (girls) in elementary geometry, a chalk drawing of "Grace Darling," in the lifeboat, showing the heroine rowing, exhibiting much expression and good drawing, by Ada Newton; a clever chalk head, &c.; from Turin-street school some good flat ornaments and an "Ecce Homo;" and from Twin-street school a geometrical window—the latter, however, incorrectly drawn for tracery. Greenwich is represented in Kender school, Amy Burgess exhibiting a carefully coloured grandiflora (life-size) painted from nature. Southwark stands well. The Poole Park girls' school shows a collection of outline drawings, in which the chief fault appears to be a want of direction. Thus we find some neat outlines of vases spoiled by want of attention to symmetry and correct outlining which a little care in a fundamental principle would have obviated. The boys' school is better. The school in Belvedere-place exhibits two clever spirited ink etchings (copies apparently), by G. H. Bedloe, age 16. Keeton-road school sends a well drawn dog's head in chalk by Samuel D. White (13), and another skilful copy of Landseer's famous picture, "Suspense," by G. A. Fountain (13). Perspective drawings are few; we are sorry to find it so, but Portobello girls' school, Chelsea, certainly takes away the palm for neatly executed diagrams showing the lines of construction. Maps offer an instructive exercise in art skill, and next to outlines we certainly think they are quite as useful as a simple means of instructing elementary pupils in drawing form; while the additional advantage they possess of fixing the locality of places makes them a highly rational instrument in the elementary school. On this, as on the last occasion, the girls have rather surpassed the boys in the care and skill shown in their drawings.

SOCIETY OF ENGINEERS.

AT a meeting of the Society of Engineers, held on Monday evening, November 4th, in the Society's Hall, Victoria-street, Westminster, Mr. E. P. Spice, president, in the chair, a paper on "Harbour Bars, their formation and removal," by Mr. Henry F. Knapp, of New York, was read. After some observations upon the importance of every port having an adequate outlet for its commerce, the author proceeded to observe that bars had been divided into three classes, chiefly—viz., Delta, Drift, and Wave. He maintained that all bars and shoals in broken or rough water should be treated in reference to wave action, as that was the sole cause of their formation. Engineers had largely accepted the theory of narrowing of a delta-forming river by jetties, as the great cure of bar formation in its entrance. That theory, to the author's mind, had no feasibility to recommend it. He observed that the amount of wave action of water depended on two causes—viz., wind and depth of water—both of which modified it from the extreme of smooth water to that of mountainous billows; and as engineers could not control the winds from causing wave action, they must modify wave action itself, so as to deepen bars and prevent bar formation. To carry this theory into practice for the prevention of the formation of harbour bars, as well as to remove those already formed, which the author does on the theory of interference to wave action, he proposes to construct a barrier directly across the mouth of a river or harbour on the outside of its bar, in a depth of 50 or 60 feet of water, and having a height of from 20 to 30 feet above the bed. As the height of this barrier is the only quality necessary to produce the required interference to wave action, the thickness need only be measured by the solidity necessary to withstand the force that it is intended to detract from the waves. This barrier, according to the author, will not offer any impediment to the free discharge of the waters of the river, but on the contrary will protect and facilitate that discharge. Neither would it offer any impediment to vessels passing in and out at all times, as its top would be lower than that of the bar. Its sole use would be to destroy the building-up power of the waves, leaving unimpaired the full force of the river to cut out the bar.

The following gentlemen were balloted for and duly elected members of the society:—viz., Mr. Charles John Alford, Mr. Patrick Doyle, Mr. Isidore Spielmann, Mr. John Greaves Hawkins, and Mr. John Price.

ASSYRIAN BRONZES.

THE Society of Biblical Archæology opened its new session on Tuesday night. A paper was read by Mr. Theophilus G. Pinches, the late Mr. George Smith's successor as Dr. Birch's assistant in the department of Oriental antiquities at the British Museum, on "The Bronze Gates of Shalmaneser III.," lately discovered by Mr. Hormuzd Rassam at Balawat during his recent archæological expedition to Assyria, resuming that interrupted by Mr. George Smith's death. The bronzes have been recognised as belonging to two pairs of gates. The merit of the identification belongs to Mr. Ready, the skilled artificer attached to the British Museum department, to whose province it belonged to cleanse the bronze fragments, to piece them together, and to nail them with the original nails upon wood of the same thickness as had been used for the purpose when this unique monument was first set up about 28 centuries ago. He then began to see that the larger set of bronze plates formed the coverings of a pair of enormous folding doors rectangularly shaped. Each leaf was about 22ft. long and 6ft. broad. They had evidently turned on pivots, which had actually reached the Museum, although the sockets in which they moved had unfortunately been left behind. At the top they were supported by strong rings fixed in the masonry. The body of the door was of wood 3in. in thickness, as measured by the nails used by the Assyrians to nail the plates of bronze on the wood. For these nails were clinched just 1-16th of an inch, which is the thickness of the plates themselves, over and above 3in. from their heads. Each door turned on a circular post about 1ft. thick. Around the doorpost the bronze plates, 8ft. long in all, lapped to the extent of a couple of feet, leaving 6ft. as the width of each door between its post and what is technically termed its "style." This "style" was also edged with bronze, the vertical inscription furnishing the text, to which the designs in *repoussé* work on the horizontal plates, representing Shalmaneser's battles, sieges, triumphal processions, the cruelties inflicted on his foes, and his worship of the gods, supplied the illustrative scenes. The "style" inscription leaves no doubt as to the monarch whose history is recorded.

Complaints having been made to the Plumstead District Board of Works that builders in their parish are in the habit of partially erecting houses before sending in plans for sanction, and that in those cases they often infringe the line of frontage, it has been decided by the board to prosecute in all future cases of such breach of bye-laws.

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ILLUSTRATIONS.

JOHN SHUTE AND THE FIRST AND CHIEF GROUNDS OF ARCHITECTURE—NEW NATURAL HISTORY MUSEUM—PROPOSED NEW CHURCH AT TEBAY—MOORFIELD HOTEL—NEW HOUSE, GREEN-HILL ESTATE, HAMPSTEAD.

OUR LITHOGRAPHIC ILLUSTRATIONS.

JOHN SHUTE, "PAYNTER AND ARCHYTECTE."

In 1563 was published in London the first practical work on architecture in English. Other editions appeared in 1579 and in 1584. So rare, however, has this work become that it now seldom appears in book auctions. The copy last sold was probably in 1842, when the Strawberry-hill library, formed by Horace Walpole, was dispersed. He was the first to notice this work, as in his "Anecdotes of Painting," 4to., 1762-71. There is a copy of the first edition in the Bodleian Library at Oxford; there is not one in the libraries at the British Museum—nor, strange to say, in the professional library at Sir John Soane's Museum. We are, therefore, much pleased at being able to exhibit to our readers two out of the five plates of the Orders of Architecture in a copy of the first edition, by the kind permission of Mr. Wyatt Papworth, who, after a search of thirty years, has lately become possessed of a good copy of this valuable publication. The work to which we refer is entitled "The First and Chief Groundes of Architecture used in all the Auncient and Famous Monymentes," &c., by "John Shute, paynter and archytecte." It is a small folio, consisting of only twenty-six leaves, including the plates, which are somewhat larger than the pages of the text. The title-page has a border of Italian ornament; then follow a preface and introduction, the plates with their descriptions of the five orders, and woodcuts of the Attic order and of the intercolumniations. The text, printed in large clear italic type, contains the precepts of Italian architecture as expounded by Vitruvius, apparently from the translation by Philander, published at Paris in 1546, as Shute states, but really in 1545, enlarged from the work on architecture by Sebastian Serlio—the only one of the modern standard authorities on Italian architecture published at the time when Shute wrote his treatise. Our readers will recall the fact that, as regards art in England, Inigo Jones was not born until 1573, ten years after the publication of the work by Shute, who describes himself as having been "servant unto the Right honorable Duke of Northumberland, 1550. it pleased his grace for my further knowledg to maitaine me in Italie, ther to cofer wt the doiges of ye skilful maisters in architectur." This fact, the publication of this work, and the long epitaph on a tablet in the former church of St. Edmund, Lombard-street, stating his death Sept. 25th, 1563, are all that is really known of Shute, for his name has not been found in connection with any buildings. Walpole supposes he was a miniature painter of repute; and, if so, we may almost assume that the figures represented in the plates are from his hand; hence giving additional interest to the work. Walpole says of them:—"The cuts and figures in the book are in a better style than ordinary." Shute evidently aimed at a good style of architecture. The two illustrations have necessarily been somewhat reduced in size: the Doric order in the original is 13⅜in. high from the top of the entablature to the ground line. They are printed in a light brown ink, to produce fac-similes as nearly as possible. It may be interesting to many of our readers to consult the plates issued by us early in the year, from drawing specially made for us from the original MS. in fac-simile, showing the style carried out about this same period in the works of another architect, John Thorpe.* Besides these two "Johns," notices also exist of John of Padua, of Sir John Thynne, and of John Caius or Keyes (an account of whom is given on page 89). All five names appear about the same time, and in repute as architects. By some John of Padua and John Keyes have been considered the same person; by others, John of Padua and John Thorpe. We yet require more information concerning them and their productions.

TEBAY CHURCH.

This church is about to be erected at Tebay, to meet the wants of a population which has grown up round the well-known junction on the London and North-Western Railway. The initiative in the matter has been taken by the Lord Bishop of Carlisle, who personally made an appeal in the columns of the *Times* a short time ago. The church will add another to the series of mountain chapels already erected in this diocese. It will seat 165 persons, and is capable of future enlargement. The church is to be built of the local material—a rough slate—the dressings being either of slate or granite. Preparations are now being made to commence quarrying, so that the work may be pushed forward in the spring.

MOORFIELD HOTEL, BROOKLANDS, CHESHIRE.

This hotel is now in course of erection a few miles from Manchester, on what is known as the Moorfield Estate. It contains, besides ample bars, a smoke-room 25ft. by 16ft., a large billiard-room, with an open-timbered roof, bar parlours, a number of bedrooms, &c. It is being built of brick, with a considerable quantity of London moulded brick and Yorkshire stone. The main staircase will be a principal feature in the building. On another portion of the estate, laid out for building, four houses are being built in a similar style to the hotel. The architect for the hotel and the estate are Messrs. Lockwood, Smith, and Heathcote, of 10, Lincoln's-inn-fields, London, and 88, Mosley-street, Manchester.

NEW HOUSE ON THE GREEN-HILL ESTATE, HAMPSTEAD.

This building, which is being completed from the designs and under the superintendence of Mr. Theodore K. Green, architect, of 22, Finsbury-place, is situated on the brow of a rather steep incline, and commands extensive views over the surrounding country. The house has a substantial comfortable appearance, not always met with in suburban buildings. The external walls are faced with Luton bricks, the window and door dressings being of Portland stone, the whole built up with a cavity in its thickness of 2½in., which we are informed is the system generally adopted by Mr. Green on this estate. The special feature in the arrangement of ground plan is that the principal entrance is kept nearly level with the road, with a porch and good vestibule, from which stone steps lead up to the hall and reception-rooms. A convenient serving-room and pantry, with lift and servants' stairs, are placed next the dining-room. The joiner's work of ground floor and the staircase is in wainscot, the remainder in pitch pine and selected yellow deal, slightly stained and varnished. The stabling, which is at the lower end of garden, is of rather peculiar arrangement, necessitated by the sudden fall of ground about 12ft. To obviate this difficulty the stabling for four horses, with harness-room, has been placed at about the natural level of ground, and the coach-house over them, with level entrance from road-way, a sloped way to stables being provided for horses. The contractors are Messrs. Roberts, of Islington.

NEW NATURAL HISTORY MUSEUM, KENSINGTON.

Our next illustration of this important building will be a large general elevation of the principal entrance with plan. The details published herewith to-day are all from this part of the building, and are taken from sketches made from the actual work. The position of the several parts will of course at once be seen by reference to the general drawing above referred to. The whole length of the elaborate and beautiful frieze over the doorways is given, as well as the entire series of figure panels below the windows over the frieze. The main caps to the great arch are varied in design, and of these we give four examples. The annulets to the main shafts are also varied in design, as will be seen by the three specimens illustrated. Our sheet, besides these, includes details of the central shaft and imposts, with a perspective sketch of the caps to the secondary shafts. The monkey spandrel and other parts are shown also. Mr. Alfred Waterhouse, A.R.A., is the architect.

* See BUILDING NEWS, Jan. 25th, Feb. 8th and 22nd, March 15th.

TABLES OF CURVES.*

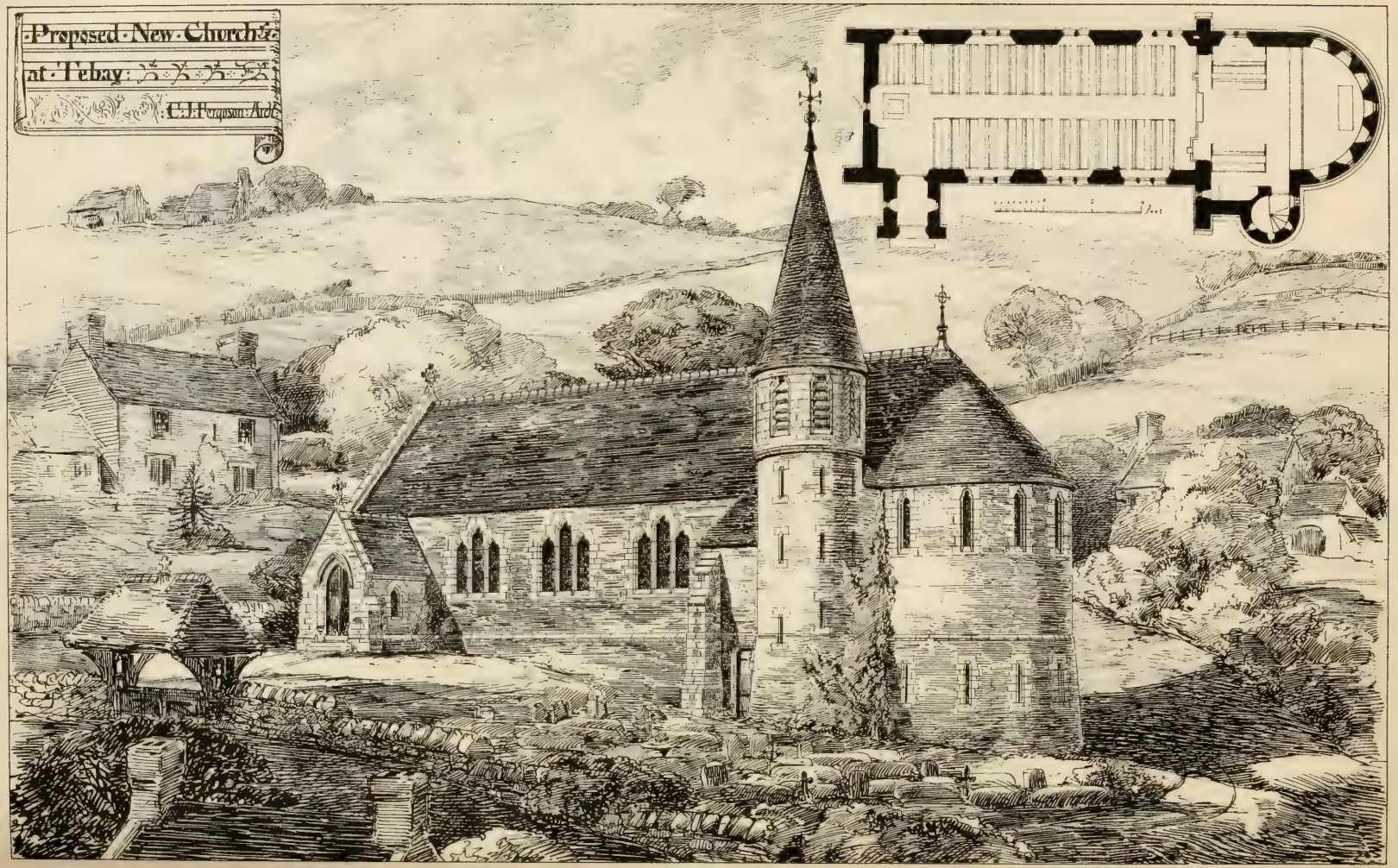
In setting out curves with the theodolite the surveyor must have often experienced the inconvenience of having to refer to a book of tangential angles, always embarrassing and awkward. Messrs. Crosby Lockwood and Co. have published a series of tables by Alexander Beazeley, M.I.C.E., in the handy form of a pack of cards, by which method the surveyor is saved the trouble of turning to the particular page of his book, having the card necessary for any radius fixed to the instrument, leaving his hands free to adjust and signal. One great advantage, to our minds, is that the figures are constantly before the observer, and there is less risk of a mistake being committed. The cards before us are small, of visiting card size, fitted into a small card case. They give the angles and multiples of curves from 5 to 200 radius. Thus when the unit of radius is given in any denomination as a chain, the chords also are of a chain in length. The author says "curves of less than 15 chains radius should be set out in half-chain chords, for which the tangential angle for chain-chords of double the radius must be used;" but the smaller chords of smaller radii are given for cases requiring expedition and only approximate accuracy. The tables of multiples given on the same side of card for each radius, furnish the tangential angle in minutes and decimals for units of radius up to 9, and will be found to facilitate fractional calculations. The author gives some clear examples of the application and the tables with the formulæ; and we are glad to be able to recommend to engineers and surveyors Mr. Beazeley's very unique form of "Tables for Curves" as a substitute in the field for the more cumbersome form of pocket-book.

The death has been announced at Neuilly, near Paris, of Charles Summers, sculptor, of Rome. Mr. Summers, who was born in Somersetshire in 1828, was a successful student of the Royal Academy, London, and whilst a young man went to Melbourne, where he pursued his profession with great ability and perseverance. When in Australia he produced many excellent busts and medallion portraits of leading and well-known men in the colony, one of the best being the bust of Captain Sturt, the explorer. The hilt of a presentation sword, which was subscribed for in Melbourne, and sent to Garibaldi at Caprera, was his work. Mr. Summers went to Rome in 1870, and has since worked there indefatigably.

On the 26th ult., at Blackbree, near Bicton, Devon, died John Way, wood carver, aged 29 years. Brought up in St. Thomas's Union, Exeter, he was apprenticed out to a chair-carver in that city. Having served his time, he articled himself to Mr. Harry Hems, with whom he stayed some time, and afterwards going to London, became attached to the permanent staff of Messrs. Farmer and Brindley. By those artists he was sent down, by an odd coincidence, in a position of trust to the cathedral of his native city, and much of the beautiful stall carving and restoration work upon the grand bishop's throne in the choir of that church, was executed by him during the several years the restoration was in progess.

A new cemetery on the Kneesworth-road has been opened at Bassingbourne, Cambs. The Episcopalian and Nonconformist chapels and the lodge have been erected from the designs of Mr. John Morley, architect, Cambridge. The contractors were Messrs. Willmott and Sons, of Bassingbourne. All the internal fittings of these buildings are of pitch pine.

* Tables of Tangential Angles and Multiples. By ALEXANDER BEAZELEY, M.I.C.E. 2nd edition. London: Crosby Lockwood and Co.



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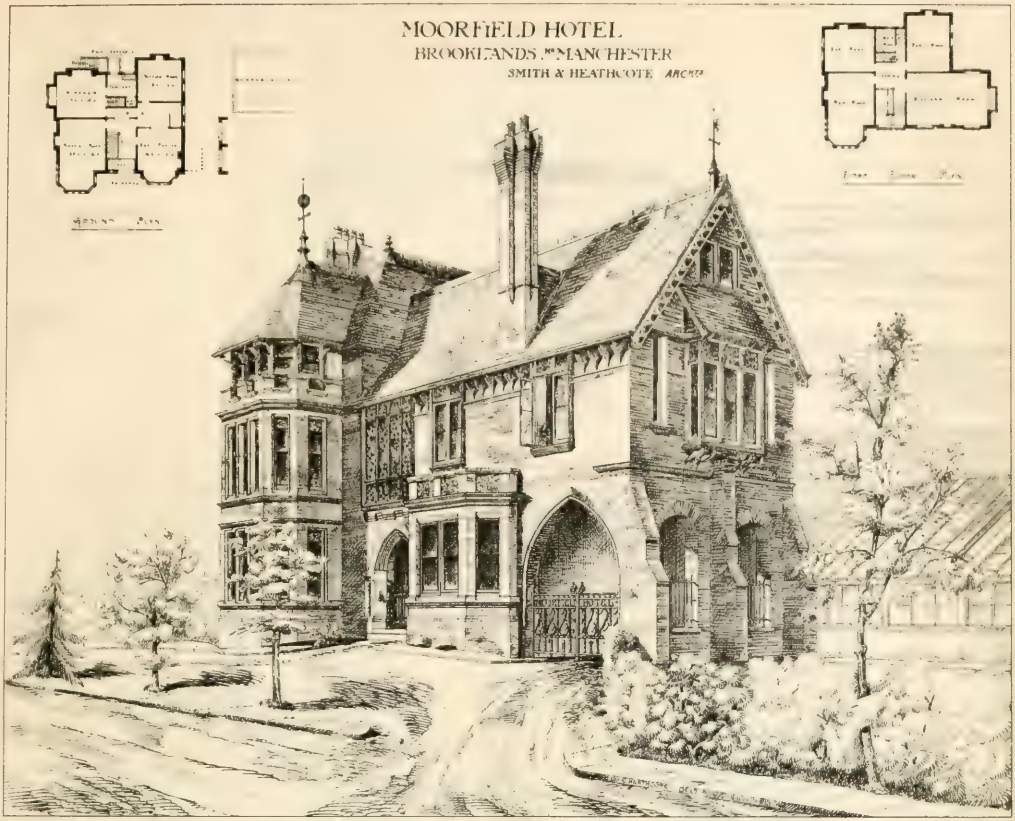
MOORFIELD HOTEL
BROOKLANDS NR MANCHESTER
SMITH & HEATHCOTE ARCHTS

NEW HOUSE
GREENHILL ESTATE
HAMPSTEAD
T. K. GREEN
ARCHITECT
GROUND PLAN

THE LATE MR. F. P. COCKERELL.

EVERY reader will regret to hear of the sudden and unexpected death of the highly-esteemed Honorary Secretary for Foreign Correspondence to the Institute of British Architects—Mr. Frederick Pepys Cockerell. Few who had the pleasure of Mr. Cockerell's acquaintance could have failed to observe in him a courteous, urbane, and accomplished gentleman, and the profession he served so long will deplore the loss of one who had, on many grounds, considerable claims to its respect. Mr. Cockerell was, it appears, at Paris in perfect health and spirits, when he was suddenly cut off. He was staying at 66, Rue François Premier, his uncle's residence, at the time, and, according to the information kindly furnished us by Mr. Charles Barry, the President of the Institute of British Architects, he had been spending the morning with a French architect of his acquaintance, and had returned home after visiting the Paris Exhibition, when he was shortly afterwards seized by a stroke of apoplexy. We understand he was 45 years of age, and has left a wife and five children. It would be impossible in this short notice to do more than recall a few incidents of his career. Mr. Cockerell was a pupil of his father, the late C. R. Cockerell, professor of architecture to the Royal Academy, and of the late P. C. Hardwicke, Esq. The elder Cockerell was more known as a *savant* and literary man than as a practical architect, though his name will be indissolubly connected with the revival of Classical design, as he pre-eminently stood with regard thereto in a similar position to that Pugin occupied in respect to Gothicism. Much of Professor Cockerell's fervour for Classical principles seemed to have been shared by his son, and we can discern in one of his most important designs — the Freemasons' Hall, Great Queen-street—many indications of that love of the classical antique which so eminently characterised his father's works. Modest and unassuming, like his father, Mr. Cockerell was never a pushing man of business, and his principal achievements have been won by his own artistic reputation and resources. Though, as we have said, he inherited much of his father's taste, he commenced his career when Gothic design had supplanted to a considerable extent the style of Sir William Chambers, Soane, the Smirkes, and their contemporaries, and many of his recent works exhibit a free use of the elements of both styles.

Mr. Cockerell was the honorary secretary for foreign correspondence of the R.I.B.A. —an office he has held for many years, and only lately in that official capacity compiled a list of foreign deceased members. He was, we believe, a competitor for the new National Gallery, and published a description of a design for that building. He was also a member of the Athenæum Club, and fulfilled the office of the superintendent of works to the Society of Freemasons. His remarks at the Institute were always to the purpose. We remember particularly some observations made by him at a recent meeting when the subject of concrete construction was being discussed, which seemed to us at the time to invest the subject with a clearness and interest only to be contributed by one thoroughly conversant with its details and capable of imparting his information to others. The funeral took place yesterday at Paris, many friends meeting at the Hôtel d'Albe, in the Champs Elysées, close to his uncle's residence.

The new session of the Institute opens under more than usually gloomy auspices. The last was marked but too evidently by the absence of its former illustrious president—the late Sir Gilbert Scott—and now one of the first acts of the members will be to pay a tribute of respect to their honorary foreign secretary, whose devotion to the interests of the Institute was perhaps only second in depth and fruitfulness to that of Sir Gilbert Scott.

Besides the Freemasons' Hall Mr. Cockerell was the architect of Sir Roger Cholmeley's schools and chapel, Highgate; schools at Coleorton, Leicestershire; church at Maroke, Yorkshire; residences at Armitage-hill, Sunningdale; at Uckfield, Reigate; Ledbury, Norwood; and various additions to Cannon's Park-house, &c.; memorial columns at Langley-park, Slough, and Castle Howard. One of his characteristic designs is the entrance to the house of the Society of Painters in Water Colours, Pall Mall East. Of other recent works we may name a house at Datchet, built in concrete and brick, and illustrated by us (page 406, Vol. XXXIII.)—a rather important work, in which the employment of concrete has been rationally indicated; Down Hall, Harlow, Essex, the seat of Sir H. Selwin Ibbetson, Bart., also illustrated by us July 4, 1873; Woodcote Hall, Newport, Salop, for C. C. Cotes, Esq., M.P., the drawing for which was exhibited in the Academy in 1877.

COMPETITIONS.

DARWEN TOWN HALL.—The Corporation of Darwen recently invited architects to send in plans for a proposed new town hall and market-house, and received applications for further particulars from no fewer than 122 members of the profession. A committee of the whole body have selected as competitors the following 24: Alexander and Henman, Stockton-on-Tees; Beaumont and Somerville, Manchester; Charles Bell, London; T. Booth, Leeds; James Deane, London; Daniel Dodgson, Leeds; R. K. Freeman, Bolton; G. E. Grayson, Liverpool; F. J. Hames, London; A. Hill, Leeds; E. Hughes, Huddersfield; John Johnson, London; Ladds and Powell, London; and Aspinall, Blackburn; Lockwood, Smith, and Heathcote, Manchester; J. Y. M'Intosh, Barrow; T. Mitchell, Manchester; Thomas Nicholson, Bristol; R. C. Page, London; G. Patrick, London; H. J. Paull, London; S. L. Sevain, Sheffield; Salomons and Ely, Manchester; Tait and Langham, Leicester; and Robert Walker, London.

LOWER THAMES VALLEY SEWERAGE SCHEME. —At a meeting of the Lower Thames Valley Sewerage Board on the 30th ult. a report was received from a committee who had considered four selected schemes—those of Messrs. Bailey Denton, Son, and North (No. 1); Mr. Haywood; Mr. Mansergh (No. 2); and Mr. Sheilds (No. 1), and recommended the scheme of Mr. William Haywood for adoption. The respective annual cost as estimated by the engineers were—Mr. Sheilds, £43,000; Mr. Mansergh, £39,000; Messrs. Denton, £37,000; Mr. Haywood, £17,000. The report was adopted by the board, a proposition to refer the premiated plan to Sir John Hawkshaw being rejected. Mr. Haywood, who is engineer and surveyor to the Commissioners of Sewers of the City of London, proposes to purchase about 700 acres of land situate on the banks of the Mole and the Ember, and at about a mile from the river Thames, and on this land to erect pumping engines and tanks, into which sewage will be raised and allowed to deposit the grosser solid and fibrous matters, and then to purify the sewage by distributing it over the ground, which will be suitably prepared by deep drainage to receive it. No chemical treatment of the sewage is proposed. The main sewer for the district will be on the Surrey side of the Thames, passing through the parishes of Thames Ditton, Long Ditton, Surbiton, Kingston, Ham, Petersham, Richmond, and Mortlake, to Barnes. Two small pumping stations are required, the one at Ham Fields and the other at Mortlake, by the Richmond Gasworks. The branch sewers will be seven in number, and are intended to serve the following places and groups of places—viz., East and West Moulsey and Hampton; Esher; Long Ditton, Kingston-common, and Hook; New Malden, Hampton-wick, and Teddington; Heston and Isleworth; and Kew. The sewers will be of such sizes that Twickenham can be included if desired. The total cost, including the purchase of 700 acres of land and professional charges, is estimated at £268,000.

SPALDING CENTRAL SCHOOL BOARD.—The board received 14 sets of designs for their proposed school buildings from architects residing in London, Derby, Nottingham, Lincoln, &c., all being under motto. After devoting considerable time and careful study on the several points of merit, &c., the number was gradually reduced to 7, then to 2, when the design bearing the motto "Bonâ-fide" was unanimously selected. On opening the letter containing the author's name, it was found these plans were the production of Messrs. Bellamy and Hardy, architects, Lincoln. All the designs exhibited much merit and labour.

ARCHITECTURAL & ARCHÆOLOGICAL SOCIETIES.

LEEDS ARCHITECTURAL ASSOCIATION.—The first general meeting for the session of the members of the Leeds Architectural Association was held on Thursday week, Mr. A. Crawford, the president, in the chair. The secretary (Mr. Hall) read the annual report, which congratulated the members upon the prosperous position of the association. It also reviewed the work done during the year. There had been meetings for receiving papers. Visits had been made to buildings of interest in progress in Leeds and in other towns. A series of competitions had taken place amongst the junior members for prizes, and the results were as follow:—For designs of a detached suburban villa to cost £2,000—1st, Richard Lawish; 2nd, John Jackson. For figure drawing—Wm. Riley. For design of small house to cost £600—1st, Wm. Riley; 2nd, G. F. Stephenson. For a set of drawings produced at the fortnightly meetings—1st, John Jackson; 2nd, Wm. Riley; 3rd, Frank Haigh; 4th, B. P. Shires. The silver medal of the association, for a set of drawings, including the Chapter-house of Kirkstall Abbey—B. P. Shires. The report was adopted. The president then delivered his opening address, the first part of which described an imaginary stroll through Leeds to examine the buildings in course of erection. In speaking of the position of architecture generally Mr. Crawford strongly urged the importance of a more systematic educational training for architects. Was it not possible for them to be as a society brought into some actual connection with the College of Science, forming perhaps eventually a recognised school for architecture and engineering? The Yorkshire College was erecting a building in which to give practical teaching of weaving, and why should it not eventually embrace a school for building also? If such a school could be established, and in connection with it a final examination of the students by the Institute of British Architects for its diploma, the result would be that intelligent clients would expect their architects to be thus qualified; that quackery would take the same place in architecture which it did in medicine; and that eventually the Institute's diploma would be recognised by law as the only entrance to architectural practice. The discussion on the paper was adjourned.

NEWCASTLE SOCIETY OF ANTIQUARIES.—Last week the ordinary monthly meeting of the Newcastle Antiquarian Society was held, the Rev. E. H. Adamson in the chair. Dr. Bruce stated that since their last meeting a very interesting Roman monumental stone had been found at Shields Lawe. Mr. Oswald proposed: "That this society regrets the decision of the town council to remove the Carliol Tower, contrary to the express wish of both the public meeting in the Guildhall and of this society, and that this resolution be advertised and preserved as a permanent protest against this act of vandalism." Mr. Farmery seconded the motion, and it was agreed to.

THE EDINBURGH ARCHITECTURAL SOCIETY. —On Saturday afternoon the members of the Edinburgh Architectural Society assembled at St. Mary's Cathedral, and found a cicerone, at once obliging and intelligent, in Mr. Morgan, the clerk of works. The nave of the cathedral may now be regarded as completed. It has

been screened off from the transepts with canvas partitions, completely filling the arches, and has been furnished with movable chairs, with a view to its being opened for service on an early day. The visitors had their attention directed, in the first instance, to the treatment of the ornamentation on the capitals of piers and window shafts. This, it was pointed out, had been kept throughout to a low relief, so as not to project beyond the profile of the abacus; and in this respect the building was said to reproduce a marked peculiarity of the old Scotch ecclesiastical architecture. In regard to the ornament generally, whether on capital, corbel, mullion, or moulding, a notable quietness of effect was remarked. While no feature specially arrested the eye, every detail was seen not only to be beautiful in itself, but to fall in with all the rest in a charming harmony of *ensemble*. Another point dwelt upon was the variety of patterns introduced in the treatment of similar parts, every window and column being varied from those immediately adjacent. The wooden vaulting of the nave was inspected with much interest, Mr. Morgan explaining the difficulty which had been found in adjusting the planking to the transverse and diagonal ribs, differently placed as these are in reference to the cornice. Passing to the great west doorway, the party readily recognised the features borrowed from Holyrood; and it was pointed out that the jambs, instead of being treated with ornamental designs continued through their whole length, were, as in an example to be seen at Jedburgh, divided by transverse bars into panels, each of which was separately sculptured in low relief. Here, again, the variety of pattern was remarked upon; and it was shown that the same feeling had been carried out in the beautiful wrought-iron work of the door, no two scrolls or flowers of which seemed to be similar in form, but which, in its general effect, was felt to be admirably harmonious. The outside of the cathedral was now surveyed, attention being specially directed to the great central tower, which indeed, so far as concerned its four central piers, and the diagonal arches which connect these to the outer buttresses, had been previously discussed. The boldness of the architect in introducing those diagonal arches, which so greatly enhance the effect of the interior by allowing a clear view into the transepts from both nave and choir aisles, was the subject of general remark; and much curiosity was expressed as to the system of counterpoising and distribution of weight on which the architect relied for the security of his structure. It was explained that the foundations of the tower were carried 23ft. below the floor of the building, the lowest course being a bed of concrete 12ft. thick. With regard to the four central piers, corresponding to the corners of the tower walls, it was stated that, while going down almost perpendicularly on their inner sides, they were stepped out, as they descended, on the outer faces, so as the better to resist any tendency to outward thrust. Attention was then called to the sloping ramps carried over the diagonal arches, and which show externally in the angles between nave, choir, and transepts, as connecting the tower with its outer buttresses. It was pointed out that the masonry of those ramps was so adjusted as to direct the thrust upon the outer sides of the diagonal arches, and as nearly as possible in a perpendicular direction upon the buttresses, thus ensuring conditions which promise stability. After looking in upon the choir, where masons are still employed putting up the ribs of the vaulting, the party passed cordial votes of thanks to Mr. Scott and Mr. Morgan for the instructive hour they had spent; and parted with the understanding that the cathedral should form the subject of discussion at an early meeting of the society.

SCHOOLS OF ART.

Barnstaple.—The prizes won during the past year by the students of the Barnstaple School of Art were distributed last week. The chairman stated that many difficulties in the way of progress had been overcome, especially since they had succeeded in getting so good a teacher as the present headmaster, Mr. Ireland. In the national competition one student passed "excellent" in advanced architecture, one passed in design, one obtained a free studentship, five obtained third-grade prizes; 10, second-grade do.; and 13 second-grade certificates.

Blaydon.—A public meeting was held on Monday night, when the Queen's prizes, gained by the students of the Blaydon science and art classes, were distributed. In the session just ended fourteen were examined in practical, plain, and solid geometry, out of whom 9 passed; 16 were examined in mechanical construction and drawing, out of whom 13 passed; 6 were examined in building construction, and they all passed; 9 were examined in steam, and they all passed; 9 were examined in applied mechanics, and they all succeeded in passing. The comparison between the percentage of passes at Blaydon and in the United Kingdom shows that in plain and solid geometry there passed in the United Kingdom 62 per cent., in Blaydon 64 per cent. Machine construction and drawing—United Kingdom 70 per cent., Blaydon 84 per cent. In building construction and drawing—United Kingdom 70 per cent., Blaydon 100 per cent. In steam—United Kingdom 66 per cent., Blaydon 100 per cent. In applied mechanics—United Kingdom 82 per cent., Blaydon 100 per cent.

Burslem and Tunstall. — The ninth annual meeting and distribution of prizes to the students of the Burslem and Tunstall schools of art was held at the Town Hall, Burslem, on Wednesday week. Mr. G. Theaker, the head master of the art school, in his report stated that the past school year has been a successful one, more particularly with regard to the number attending, there having passed through the school during that time a greater number than in any previous year since the opening of these classes—namely, 246, including 51 students in science subjects I., II., and III. At the annual local examinations held last May, 117 students were examined in second-grade geometry, freehand, model drawing, and perspective, 41 of whom were successful. In artistic anatomy three students were examined, one gained the mark "good," and one passed. In design, four were examined, one passing "excellent," thereby obtaining a Queen's prize. In the advanced stage, 97 works by 16 students, and in the elementary 2,266, by 163 students, were sent to the Department in London; of these the examiners awarded the maximum grant on the works of 10 advanced and 20 elementary students. At the examination of the works above mentioned in London, 13 students obtained 15 third-grade prizes and five free studentships. In the national competition two students have been successful—one obtaining a book prize for drawing the figure from the antique, and the other a silver medal for a model of ornament from a cast.

Egham and Staines.—On Wednesday week the prizes and certificates were distributed to the classes, which were opened in January, 1877. In the second session just closed 61 pupils joined, and 25 gained certificates.

Guildford. — The prizes and certificates gained by the students in the science and art classes were distributed on Thursday week. The ninth annual report showed a satisfactory return—the attendance in all classes having steadily increased. The May examinations were attended by 187 candidates, and 6 prizes and 21 second-grand certificates were gained.

Hartley Institution, Southampton.—The prizes and certificates awarded by the Science and Art Department were presented by Lord Francis Hervey, M.P., on Monday, the 4th inst. The School of Art report showed that during the last session 107 students had attended the classes—82 belonging to the artisan class. 430 studies were submitted for examination in April, the work of 65 students in the various art stages. At the May examinations 50 candidates belonging to the school were present, and worked successfully 37 second-grade papers, nine receiving prizes. Three papers in the third grade were tried, and all were marked satisfactory, two of them being "good." In the science subjects usually taught in art schools, viz. — Descriptive Geometry, Machine Drawing, and Building Construction—there were 31 candidates, 13 of whom gained second-class certificates, and eight gained Queen's prizes. The total number of individual candidates at the various examinations were 60, and of successes there were 39 passes and 17 prizes. In the science school one student gained an exhibition at the Royal College of Science, Dublin, of the annual value of £50, tenable for three years.

Newcastle-under-Lyme. — The annual meeting of the Newcastle-under-Lyme School of Art was held on Tuesday. The twenty-fifth annual report congratulated the subscribers on the satisfactory state of the school generally. Out of the six national scholarships offered to the United Kingdom by the Science and Art Department during the past year two had been gained by students of this school. Thus the school was now represented at South Kensington by three national art scholars. As to the financial state of the school there was no material improvement. Mr. Bacon, headmaster, reported that the attendances at the classes had been more numerous this year than in any previous one. Drawings produced in the school were sent to London in April, and one third-grade prize was awarded, which was somewhat strange, as the drawings were of a more advanced character than those of the previous year.

Nottingham.—The annual meeting of this school was held on Wednesday week at the institution in Waverley-street. The report showed that the attendance of students had been more regular than hitherto, and the general results extremely satisfactory. The Government grant obtained was £398 18s., being an increase of £46 9s. on the previous year, and the largest amount yet obtained. There had been a slight decrease in the number of students from 496, in 1877, to 486. The financial statement showed a deficiency of nearly £130, chiefly owing to the large outlay incurred in repairs and maintenance of the building. The prizes obtained showed that not alone was designing for lace manufacture successfully prosecuted, but also designing for other manufactures, as well as architectural drawings. A diploma of honour had been awarded to the town of Nottingham at the Paris Exhibition in recognition of the abilities of the lace designers and draughtsmen. The local prizes for lace designs were awarded by a committee of Nottingham manufacturers; 43 designs were submitted by 30 students. Great satisfaction was expressed at the degree of excellence displayed, which was far superior to that of any previous year. Thanks were expressed in the report to Mr. S. Dutton Walker, A.R.I.B.A., for the completion of the carving and external decoration of the building, which has been carried out under his superintendence by Mr. Birchenough, assisted by Mr. W. P. Smith, and at a cost of about £500, almost the whole of which was collected by Mr. S. D. Walker's unaided exertions. It is shown that in 1877 Nottingham was second only to Birmingham and her five branch schools in the list of the Goverment payments on results, and that Nottingham received 1-36th of the entire amount awarded to the 144 schools of art in the kingdom, and not only obtained the highest value in prizes (£84), but 1-17th of the entire value distributed. In the course of the proceedings a vote of thanks was accorded to Mr. J. S. Rawle, the head master, for the able and efficient manner in which he had conducted the school.

Additional sick wards, with certain other alterations, are being carried out in connection with the Llanelly Union Workhouse, from plans prepared by Mr. J. B. Morgan, architect, Llanelly.

The old burial ground of St. Mary's, Newington, has been formally opened as a public recreation ground. The parish church, the fourth that has stood on the site, was removed three years since, in order to widen Newington-butts, and in the centre of the frontage a Decorated Gothic memorial clock-tower, 108ft. high, has been erected from the designs of Messrs. Jarvis and Son, of Trinity-square, carried out by Messrs. Colls and Sons and Messrs. Pentney. The churchyard, enlarged by throwing into it the site of a house removed under the street improvement scheme, has been laid out as a garden. Most of the tombstones have been removed, and trees and shrubs planted. The tar paths have been laid by Messrs. Wright and Charlton, of Bridge-street, Blackfriars.

A cottage hospital has been erected on the Cilcain-road, Mold, from the designs of Mr. Douglas, of Chester.

Building Intelligence.

ALTOFTS.—The Archbishop of York consecrated the new Church of St. Mary Magdalene at Altofts, near Normanton, last week. The church, which has been erected at a cost of between £6,000 and £7,000, consists of a clerestoried nave, with north and south aisles, and chancel, having organ chamber on the north side, and choir and clergy vestries on the south. The style is 14th century. The church is built of stone, from the quarries of Mr. B. W. Higgins, of Oulton, but internally the walls are plastered and tinted. Above the chancel arch rises a bell gable, but provision is made at the west end of the church for a tower to be built at a future time. The pulpit and font are of Caen stone. At the east end is a reredos in Caen stone, extending across the east wall, and returning along the walls of the sanctuary on the north and south sides. The work has been carried out by Mr. Tomlinson, of Leeds. The reredos, font, and pulpit have been executed by Mr. Throp, sculptor, Leeds. The building throughout has been designed and carried out under the superintendence of Messrs. Adams and Kelly, architects, Park-row, Leeds.

AYLESFORD. — The parish church of St. Peter, Aylesford, which has been thoroughly renovated and restored, was reopened for divine service on All Hallows Eve. Where necessary the fabric has been repaired, the ceiling has been raised, and the old oaken roof, which was formerly ceiled, has been exposed. The gallery at the west end of the church has been entirely removed, and the organ set up in a more convenient position—viz., in the north chancel. The tower has been thrown open, and in it have been placed the majority of the mural tablets from various parts of the building. There is a new floor to the whole building, the arrangements at the east end of the church have been greatly altered and improved, and a new south porch has been erected. The whole of the work has been carried out under the direction of Mr. A. W. Blomfield, architect, of London.

CHIPPING NORTON.—This fine and large Decorated parish church was reopened last week after partial restoration from the plans of Mr. Bruton. The principle adopted as to masonry has been to remove all the repairs that had been executed in cement, and to replace the missing members in stone—a process which has led to several interesting disclosures, including that of a shrine of three niches at the east end of northern arcade in nave, and of an opening into tower from nave. The high pews have been replaced by benches of oak, with panelled ends. The south porch—a fine structure, with groined roof and upper story—has been carefully repaired, the floor lowered 18in., and the ancient staircase from within the church to the upper room re-opened. All the works have been executed by local tradesmen, the chief contracts having been taken by Mr. Cooper, of Aylesbury, and Messrs. Hobbs, of Chipping Norton.

EXETER.—A new chancel has just been added to St. James's Church, Exeter, from the designs of Mr. R. Medley Fulford, F.R.I.B.A., architect, of that city, and was consecrated on the 24th ult. The completed work consists of chancel, with north and south aisles, and choir and priests' vestry, and the accommodation is for 40 members of the choir, and 90 worshippers in the aisles. The chancel is 31ft. 3in. × 19ft. 5in. The walling stone used is a local one, known as Pocombe, and the dressings are Hamhill stone. The chancel is carried by Mansfield columns. The chancel arcades are each of two bays, supported by Mansfield columns. The clerestory windows are cinque-foiled in a circle. The east window is a triple light, the shafts being of red Mansfield. It is filled in by a good painted window by Messrs. Clayton and Bell, of London, and has been erected as a memorial to the late rector. It represents "The Crucifixion," with figures of the Blessed Virgin and St. John; below is "The Agony in the Garden," "The Bearing of the Cross," and "Ecce Homo." In a wheel window above is "St. James." The roof is of pitch-pine, boarded and panelled in six angles. There is a doorway in south aisle, and a north porch as well. The choir seats and low screen were formerly in the nave of Exeter Cathedral. The lectern is of carved oak, and has been made by Mr. Harry Hems, of Exeter, and the wrought-iron work is by Mr. Rice, of St. Sidwells, Exeter. The walls will be decorated with "sgraffito" work at some future time. Mr. Stile, of Exeter, was the contractor for the works generally.

LEEDS.—The memorial stone of the new Presbyterian Church of England in Cavendish-road, Leeds, was laid on Oct. 23. The principal or ground floor of the church will be 13ft. above Cavendish-road and approached by a flight of steps 14ft. in width. The body of the church is 62ft. by 46ft., giving accommodation for 443 adults, allowing 20in. to each, the pews all radiating from the rostrum. A gallery is provided at the lower end of the church next Cavendish-road, with accommodation for 157 persons. Under the church is placed a large schoolroom, book and store rooms, duplicate lavatory arrangement, staircases leading to church, a residence for caretaker, and entrance from Cavendish-road and Tonbridge-street. The style is Italian, the principal front being divided into five parts by pilasters. The façade is three stories in height, and will have a rusticated basement of stone with a superstructure executed in red pressed bricks. The estimated cost of the building (inclusive of land) will be about £6,000. The architect for the building is Mr. James B. Fraser, F.R.I.B.A., Park-square, Leeds.

LONDON SCHOOL BOARD.—At Wednesday's sitting of this board the tender of Mr. G. S. Pritchard, of Paul-street, Finsbury, amounting to £4,579, was accepted for the enlargement of Hamond-square School, Hoxton, by 400 places. This is at the rate of nearly £11 9s. per seat, but it was explained that the school was one of the earliest built by the board, and was not planned with power of enlargement, and the tender includes the necessary connections with old buildings, erection of new staircases for boys and girls, rebuilding blocks of w.c. buildings, and alteration to covered ways, &c. A committee was authorised to incur the following expenditure for the supply of the necessary furniture and fittings to the under-mentioned recently-enlarged schools:—Bellenden-road, Peckham, £239 7s. 8d., 388 school places, equivalent to 12s. 4d. per head; and Henry-street, Hampstead, £176 13s. 6d., 189 school places, equivalent to 18s. 9d. per head.

METROPOLITAN BOARD OF WORKS.—On Friday it was decided to contribute the following sums to local authorities in London, being moieties of cost involved in improvements:—Westminster district board, for widening access from Alexandra-street to Palace-street, £2,750; St. Olave's district board, widening Mazepond-street, £687; Poplar district board, widening St. Leonard's-street, £392; and Islington vestry, improving Birkbeck-road, Upper Holloway, £50. Drawings of proposed alterations to the fire-brigade premises in Watling-street, so as to enable that part not required to be let, were submitted, and led to a discussion on the need for greater protection of the City from fire. The matter was referred to the works committee, to inquire into and report on before any steps be taken with respect to letting the premises. Messrs. J. and J. Greenwood were instructed to carry out necessary works to the following dangerous structures: 235, Westminster-bridge-road, and 162, Camberwell New-road, Lambeth; Phœnix Lower Wharf, Ratcliff, and One Tree Cottage, Mill-yard, Whitechapel. It was decided not to apply in the ensuing session of Parliament for any amendment of the Metropolis Local Management Acts or the Metropolitan Building Acts, so far as they relate to the streets and buildings of the metropolis, but to proceed only with a bill for the protection of sewers from injury. The engineer was authorised to employ additional assistance for the preparation of plans and books of reference for the proposed high-level Tower-bridge. A letter from Mr. G. Vulliamy, the superintending architect, requesting the board, in consideration of additional duties devolving upon him, especially in connection with theatres and music-halls under the Metropolis Management and Building Act Amendment Act, to consider his present salary, was referred to the works committee.

PARRACOMBE, DEVON.—The new church at this out-of-the-way little place was consecrated on the 19th ult. The building is in the Early Decorated style, and has been erected from the design of Mr. William C. Oliver, architect, of Cross-street, Barnstaple; the contractors for the work being Messrs. Bevan and Sons, of the same town. Accommodation is provided for 190 persons, and the plan consists of nave, north aisle, west-end tower, and chancel. The nave is 43ft. long and 18ft. wide—the aisle being the same length and 12ft. wide. The chancel is 24ft. × 15ft., and the nave is divided from its aisle by a good arcade of three bays. All the detailsare plain, and the walling consists of stone quarried from the glebe close by. The east window has three painted lights, representing the Resurrection, and this and the other stained glass are by Mr. W. Dixon, of London. The tower is 60ft. high. Externally all the dressings are of Ham-hill stone, which tones nicely. The internal dressings are Corsham stone, and the walls are stuccoed—finished with a warm tint. The encaustic tiles are by Messrs. Maw and Co., and the stone carving is by Mr. Harry Hems, of Exeter. Over the altar is a plain stone reredos, with three divisions. The pulpit is also of stone. The font is the one formerly in the old church. The tower is to have a new set of bells. The entire cost has been about £3,000. The old church has been left standing, and will be utilised as a mortuary chapel. This arrangement has so pleased Mr. Ruskin that he has written a letter of approbation to the rector (the Rev. P. N. Leake), and enclosed therein a liberal donation.

PORTSWOOD.—The new chancel at Christ Church, Highfield, Hants, was consecrated on Friday week. The church is in the Decorated style, and now consists of a double nave, south aisle, chancel, and north and south chancel aisles, a vestry, and south-east tower and spire. A new north-west porch has been added, and new windows put in on the north side of the nave. The avenues are laid with Portland stone sills filled in with encaustic tiles. The walls are cemented inside. They are built of Swansea stone, having Bath stone dressings, and the roofs are covered in by tiles of a warm hue. The spire at the east end of the nave has been somewhat heightened and covered with oak shingles. The chancel itself comes in the centre of the two naves, so that the one divides equally with the other a sight of the altar. The whole of the wood and stone carving, also the sculpture, has been carried out by Mr. Harry Hems, of Exeter. The encaustic tiles upon the floors are the work of Messrs. Minton. Mr. Amey was the clerk of works, and Messrs. J. Colson and Son the architects. The total cost of the work is £4,000.

TALLINGTON.—St. Laurence's Church, Tallington, was re-opened on Tuesday week after restoration. While proceeding with the works that have just been going on the workmen discovered foundations which Mr. Davis, of Bath, the architect engaged in the restoration, thinks date as far back as any in England. The church consists of nave, with aisles and south porch, transepts, chancel, and tower. The entrance doorway dates from the beginning or the middle of the 11th century. The chancel arch, which agrees with the date of the side aisles, is not in the centre of the nave, neither is it in the centre of the chancel. This is most remarkable, and like the arrangement of the tower arch cannot be explained. There is a piscina of the 12th century. In the vestry is a Norman piscina that was found under the floor, and in the south aisle there is a 14th century one. The bases of the north arcade are somewhat uncommon. The church has been paved with Maw's tiles, the plaster has been removed from the walls, new roofs have been put in, seats of pitch pine have been introduced, a new pulpit in Bath stone erected, a brass lectern has been presented, and the porch has been supplied with new gates. The restoration has cost £700 or £800.

YORK.—The Military and Royal Engineer Staff of the western district have now removed from their old headquartess at Manchester to a very handsome and commodious suite of offices which have just been erected for them at York.

The works have been carried out by Mr. Weatherley, builder, York, under the direction of Major Malcolm, R.E., and we understand that all the locks and door furniture were supplied, according to the War Department specification, by Mr. James Hill, of Upper Thames-street, London. Messrs. J. and W. Beauland, of Bradford, are now engaged in the erection of a large block of barracks at York, where it is intended to form one of the largest military centres in the kingdom.

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All letters should be addressed to the EDITOR, 31, TAVISTOCK-STREET, COVENT-GARDEN, W.C.

To Our Readers.—We shall feel obliged to any of our readers who will favour us with brief notes of works contemplated or in progress in the provinces.

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Cases for binding the half-yearly volumes, 2s. each.

Received.—R. T.—B. S.—J. H.—W. S.—R. J. A.—G. W. Ry. Co.—C. and G.—E. L. B.—B., of S. on T.—C. T.—C. H. and Co.

Civis. (We gave long ago all information to hand about the portable Norwegian houses. We believe they were commercially introduced into this country, but we do not know by whom. An advt. in our columns might possibly bring you a reply from the importers if they are still doing business.)—M. T. M. (It may be possible we do so, but we have not the control always of the sizes of the drawings submitted to us.)—J. Sulman. (See advt. pages.)—Pells and Son. (Generally if of a good colour, but not if brown or dirty.)—M. (From all we know at present we should hesitate to recommend the patentee in question. Possibly the Papier Maché Co. could supply you.)—Bonnie Dundee. (School buildings in the neighbourhood of London may be built at about 6d. to 7d. at the present time.)—H. B. (Several modern churches are unplastered inside. We may refer you to St. John the Divine, Vassall-road, Kennington, St. Mary's, Whitechapel, a church at Battersea, and several others. White mortar or coloured pointing is sometimes adopted.)

"BUILDING NEWS" DESIGNING CLUB.

We have received two comments—one by "Non Competitor" and another by Will T. Biggs—upon the design of "S in Circle" we published last week. In the first place "Non Competitor" wants to know how "S" obtains the bay windows in attic plan, how the 9in. wall is carried, how the servants' w.c. is lighted. In answer to "Non Competitor" we imagines his strictures are intended for "S in Circle," and we invite him to answer for himself. "Non Competitor," however, may be informed the few technical objections he makes are not so great as to interfere with real merit of plan, which he does not dispute. The bay window return is certainly more artistic than constructive, but the chief return walls might be formed of timber and tiled, and the splay might be carried at the ceiling level within roof. The servants' w.c. receives a light from an open area. The objection to the 14in. hollow wall is one of very trifling import, as any practical builder could carry such a wall without corbelling. W. T. Biggs complains of a more serious defect, that, however, did not escape us—namely, how a person will come out of the study when the door between lobby and hall is open? It is also rather close to foot of stairs. The other objections refer to carrying the walls, all of which objections are met by arches or girders.

OUR COMMONPLACE COLUMN.

Received.—W. W.

C. P. Edwards. (The week after next.)

Intercommunication.

QUESTIONS.

[5575.]—**Solid Content of Hollow Column.**—Can any of your readers explain the rule for finding the number of solid feet in a hollow marble column 30ft. high, the external and internal diameters measuring 8 and 6ft. respectively?—Rex.

[5576.]—**Surveyors' Fees.**—A builder contracts from quantities to erect a building for a certain sum; consequent on his neglect, delay, &c., he is suspended, and another builder employed to complete the work. The work done by contractor No. 1 is measured and valued; should the amount paid by him to the surveyor for the original quantities be allowed in the valuation?—J. J. P.

[5577.] — **Railway Compensations — Lands Clauses Act—Severance.**—My client holds on lease, at an undivided ground rent of £30 per annum, ten houses adjoining each other in one block, which produce an annual rental of £200; a railway company have given notice to purchase eight of the houses, leaving two on my client's hands. The ground rent has been apportioned and divided by two justices, as provided in the Lands Clauses Act. As the trouble of management and collection of the two houses will not be reduced proportionately to their value, and as, in the event of a sale of the remaining two being at some future time desired, the vendor's cost will be as much for the two houses as for the original ten, is he not entitled to damage for severance? All the text-books, such as those by Bannister Fletcher—originally published in your columns—Wordsworth, Yoole, and Lloyd, state that severance damage is recoverable, but they are all extremely reticent in any explanation of what is damage by severance in law. Arbitration (under Lands Clauses Act):—Wordsworth, in his "Law of Compensation," says:—"Where more than one arbitrator has been appointed, and either of them refuses, or neglects for seven days to act, the other may proceed *ex parte*, and his decision becomes as effectual as if he had been arbitrator appointed by both parties.—8 Vic., c. 18, s. 30." Supposing both arbitrators appointed, and neither take any steps for seven days, what is the effect? Can either or both proceed *ex parte*, or does the arbitration fall through? I should feel obliged if your correspondent Mr. B. Fletcher, or others, would favour me with a reply.—Lex.

[5578.]—**Creosoting Timber.**—Will any reader give me information as to the advantages, or otherwise, of creosoting oak posts for a post and rail fence, and which is the best apparatus for the purpose.—T. M.

[5579.]—**Stone Quarry.**—Will any of your numerous readers kindly inform me what is the usual rent or royalty on letting a sandstone quarry in the midland counties?—T. R. H.

[5580.]—**Architect's Charges.**—I am somewhat taken aback by the recent action of a client, who has gone in for some wholesale deductions from a professional account, and I would beg the favour of your inserting the following inquiries in your very able journal, in the hope that some of your numerous readers will kindly help me with their own opinion and practice, as the questions are of such general interest to the whole profession. To avoid occupying your valuable space, and the time of your correspondents in replying, I have numbered the several queries. There is no agreement binding either side:—1. Is it the custom of architects to charge the 5 per cent. commission on the total cost of all works necessary to make a house fit for habitation, or can the client refuse to pay the architect commission on things he agreed to find himself? 2. Can the client legally deduct from the total cost and refuse to pay commission on the value of any articles used in the building which have been ordered by the architect at the desire of, and paid for direct by, the client? 3. The client (after works have started) orders sashes and frames omitted (for which a proper deduction is made from the builder's contract), and instructs the architect to put in metal casements, which he pays for direct, and refuses to pay architect's commission thereon. Can client legally do so? 4. The client directs estimates to be obtained for a kitchen range, &c., which he rejects as being too costly, and subsequently he obtains and accepts a tender for range, &c., much less costly. Can client refuse to pay architect's commission if only charged on the lowest amount? 5. Is it usual to include the salary and expenses of the clerk of works as a part of the total cost upon which the architect's commission of 5 per cent. is charged? 6. Is the architect bound to supply (without charge) copies of contract drawings (over 20 sheets), with special interleaved specification and bill of quantities, also all stationery for use of clerk of works. 7. The client chooses to use up a lot of old grates, chimney-pieces, and boilers, and what was deficient he orders and pays for direct, irrespective of the architect. Can client legally refuse to pay architect 5 per cent. commission on their cost (they were all thought out and shown on the drawings, but not included in the specification and quantities, beyond provision for their fixing)? 8. Is it usual to charge for a preliminary survey and expenses? In this case it was obtaining the necessary and complete particulars of a ruin, with its details, a long distance by rail from the architect's residence, and (in addition to the office staff) requiring the aid of artisans and labourers to open and expose various parts, their railway fares and expenses in coming from a distance having been defrayed by the architect.—Provincial, S.

REPLIES.

[5514.]—**Damp Walls.**—The assertion of your correspondent, "G. H. G.," that I "cling to the idea that thick solid walls must be impervious," is one of those careless statements which tend to make the discussion of any practical question useless. I have no doubt that an ordinary brick wall, however thick, will transmit to some extent both air and moisture. The effects of constant dripping from a leaky spout will sufficiently shew the latter property. What I dispute is that a well-built wall of the thickness of 14in. and upwards will allow rain "to soak through the bricks and pour down the inside," as described by "Architect," who sent you this question, and as I have often heard asserted by others. I have known condensed water run down the smooth inner faces of walls, and have seen damp which may have come through walls from long-continued exposure to rain; but in a well-warmed and well-ventilated house the moisture is, in my experience, either prevented or taken up by the dry internal atmosphere. When water pours in after the fashion described, I strongly suspect, and have repeatedly proved, that it comes in at the junction of the roof and wall, and soaks down the inner face of the wall. If it is a hollow wall, some of the water is arrested by the ties, when (unless they dip outwards, and are free from mortar) it crosses to the inner face, so that the ties may be counted by the mouldy spots in the room. I am prepared to hear this disputed, and it is perhaps useless to ask why it is chiefly in costly houses that the rain pours through the walls, when we find cottages, barns, and stables, built with no particular care, that are fairly dry. I might also ask why, in a fence wall that is exposed to driving rain, the water does not run through and pour down the sheltered side, as it is said to do in houses? I am open to change my opinion on trustworthy evidence; but where there is so much loose assertion as I have personally known to be made on this subject I know there must be careless observation, and I want reliable facts.—Thos. Blashill.

[5520.]—**North Point.**—As stated in my previous reply upon this vexed question, magnetic north is now west of true or astronomical north by about 18° 50 at Greenwich. The following is taken from this years *British Almanack*:—"The variation is westerly—that is, the magnetic pole is west of the true north pole, and is found to be decreasing in the United Kingdom about 9 annually. Scilly Islands, 20° 17'; Portsmouth, 19° 17'; London, 18° 49'; Edinburgh, 22° 10; Dublin, 23° 4'." The above are estimated for the year 1878. Surely your correspondents should be more careful in the replies, which might mislead any one who believes anything he sees in print, with "mean time," "equation of time"—that is, difference between solar and Greenwich time. And longitude east or west any one can test the matter for himself, with an almanack, a watch, and a pocket compass.—Francis E. Jones.

[5551.]—**Valuer's Licence.**—It is not necessary to hold a valuer's licence except for the purpose of making valuations liable to stamp duty. The following appraisements and valuations are exempt from stamp duty—viz.: Those "made for the information of one party only, and not being in any manner obligatory as between parties either by agreement or operation of law; or made in pursuance of the order of any court of admiralty, or of any court of appeal from any sentence, adjudication, or judgment of any court of admiralty or vice-admiralty; or of any property made for the purpose of ascertaining the legacy or succession duty payable in respect thereof."—*Law Times Almanack.*—Lex.

[5551.]—**Valuer's Licence.**—A licence is usually taken out by valuers or appraisers under the Stamp Act, 1870, but appraisements or valuations made for the information of one party, and not obligatory as between parties, are exempt; so a surveyor who makes a valuation for mortgage is not required, according to my reading, to have a licence. I know the point is rather a disputed one, but it is a fact that valuations are made by surveyors without licences. The question is certainly one upon which the profession should be definitely informed, and I am glad that the "Intercommunication" column has been thrown open for its discussion. In such cases as these the custom of a profession should be considered. Perhaps this will meet "J. P. O.'s" question, and also "S. E. T. O.'s" reply.—G. H. G.

[5560.]—**Stability of Walls.**—I have always used the following rule, presuming force of wind 20lb. per sq. ft.; then for a wall 30ft. high above ground line, the pressure against it in lb. per foot of its length will be height 30ft. × 20 = 600lb. This force spread over the height of 30ft. has the same effect in tending to overturn the wall, as if it were to act on a point situated at half the height of the wall above ground = 15ft. This is the centre of pressure, and the leverage with which the pressure acts to overturn the wall is the vertical height of the centre of pressure above the base of the wall; this, allowing foundation 3ft. deep = 18ft. The moment of force about the fulcrum of the outer footing is therefore 600 × 18 = 10,800lb. The wall resistance

must be at least equal this. The resistance of the wall is compounded of its weight multiplied into the distance of its centre of gravity from the fulcrum about which the force of the wind tends to overturn it. The centre of gravity of a uniformly thick wall is in the centre of its thickness. Thus, in "J. X. B.'s" case, wall 30ft. high, footings, say, av. 4·0 × 3·0, then—

30ft. × 2·5 = 75 sq. ft.
4ft. × 3 = 12 „
87 sq. ft.

Then the weight of wall per foot of its length, at 112lb. per cubic foot, will be 9,744lb., acting at a distance of 1·75ft. from the fulcrum, 9.744 × 1·75 = 12,180. Thus we see that a wall 30ft. high, and 2ft 6in. thick, has a resistance of 12,180lb, as against 10,800lb pressure.—E. F. Dawson.

[5561.]—**Curve of Equilibrium.**—I shall be glad to explain this curve, which is the "curve of equilibrium" assumed by a flexible chain when allowed to hang loosely between two points. I may premise that about the middle of the last century the first mathematicians, following the train of the Newtonian philosophy, applied themselves to the theory of the arch. Dr. Hooke I believe it was who first promulgated the idea that the figure assumed by a chain suspended loosely was, when inverted, the proper form for an arch, supposing all its stones were of equal weight. No one can dispute the proposition—it is self-evident, because the mutual pressures in an arch of loose stones correspond exactly with those tensile forces which exist between the links of the chain, for the same forces which press together the stones in the arch are equal, and exactly opposite to those that sustain the chain. So far the principle is axiomatic—it gives us a tottering not a stable equilibrium—but the argument is whether such a curve is not the best to insure stability in cemented arches. Undoubtedly it is, for if we consider the point of contact to be planes—as they really would be in an arch so composed—the curve of pressure will pass through each space perpendicularly, and the stability of the structure is maintained so long as this line passes through those surfaces. We have a case of stability, and this condition can be increased by increasing the length of the joints or arch stones. Next "J. X. B." asks, how is the curve applied to semicircular arches? Now, though the catenarian curve is the only form for an arch of equal-weighted stones, it does not suit the circumstances of an ordinary bridge, with a level or usual form of roadway. To weight a chain to the semicircular curve it will be found that the load at the springing becomes an infinite quantity, and the extrados or external outline of such an arch would not suit a bridge; and to find the form of an arch, so that the curve of equilibrium may pass through it, it is necessary to load the arch in such a manner that the weights on each arch stone shall coincide with the weights suspended from a chain of a similar curve. This may be done experimentally as follows:—Let a chain be made to hang loosely between two points equal by scale to the proposed arch; next get bars or pieces of chain of different lengths, and weight each link with them, so that the required curve will be obtained; when this is done invert the curve, and give it such a form of extrados as will correspond with the loads on the links. Instead of a chain, a system of bars forming a polygonal framing may be assumed. In such a system, whose parts are in equilibrium, the several strains on the bars may be represented by lines drawn through a given point parallel to those directions, and limited by a given vertical line proportional to the several weights. It is evident a series of triangles are thus formed from a given point, the radial lines representing the strains in the different bars respectively parallel to them; and the segments cut off on the vertical line will represent the weights at the different angles of the frame. I may add, although the principle of the equilibriated curve is a valuable one, it cannot be applied in practice, as every arch has to be considered as a homogeneous cemented structure, and the stability of the real arch has to be determined by other considerations to which I need not now refer. —G. H. G.

[5564.]—**Thickness of Lead.**—I send the following:—

Weight. lb.		Thickness. in.		No. B.W.G.
4	...	·048	...	18
5	...	·080	...	14
6	...	·100	...	13
7	...	·112	...	12
8	...	·135	...	10
9	...	·153	...	9
10	...	·166	...	8
11	...	·187	...	7
12	...	·203	...	6

These are for milled lead, and are reliable.—E. F. Dawson.

The Burnley Corporation have introduced a clause in the draft bill of next session for increasing their borrowing powers, bearing on the possibility of the electric light supersedieg that of gas to the following effect:—"To supply any artificial light within the limits of the gas district of the Corporation, and to charge rates therefor." The gasworks at Burnley yielded last year £6,000 clear profit to the Corporation.

STAINED GLASS.

Darrington, Yorks.—The east end of this church has been filled with stained glass as a memorial of Mr. J. H. Barton. The window is a five-light one, in Perpendicular style, and has been executed by Messrs. Burlison and Grylls, from designs by Mr A. N. Bodley. It represents the Crucifixion, with the Virgin Mary, St. John, St. Peter, and St. Paul on either side; below, in the centre light is St. Luke, with, on right and left, St. William of York, St. John of Beverley, St. Wilfrid of York, and St. Paulinus. The tracery above contains figures of angels and sacred emblems.

Stoke d'Aberon.—On All Saints' Day a new stained-glass window was unveiled at the parish church. The subject, designed by Mr. N. H. J. Westlake, F.S.A., of the firm of Messrs. Lavers, Barraud, and Westlake, is "The Resurrection of the Just," from Rev. xiv., 13. The style is Late Perpendicular.

WATER SUPPLY AND SANITARY MATTERS.

Burnley.—The report on sewage and General Scott's cement process, as adopted at that town, is before us. Mr. William B. Bryan, C.E., the engineer to the Corporation, enters into the intercepting and outfall works at length, the details of which are unnecessary to refer to here. The Corporation entered into an agreement with Scott's Company by which the company undertook to purify the sewage, to provide the necessary precipitants, to guarantee the best effluent by the lime process, to construct all necessary works—the Corporation on their part undertaking to grant a lease of sewage and land to the company, to erect the required liming works, and to pay to the company annually 6d. per head of the population. Our readers know the process too well to need explanation. We may state, however, that the sewage of Burnley varies 1,000,000 gallons in 24 hours, and that excellent hydraulic lime, quick-setting or Portland cement is produced that has withstood a high tensile strain. The report concludes, the state of the rivers Brun and Calder are far from satisfactory, owing to the solid matter thrown into them, and that steps are necessary to abate the pollution. It is satisfactory, however, to hear that the interception of the water-carried sewage has been carried out thoroughly.

Some additions are about to be made to the new market at Campfield, Manchester, at a cost of about £4,000, from the plans of Messrs. Mangnall and Littlewood, the architects.

The Shrewsbury new brigade depot is rapidly approaching completion, and will shortly be ready for occupation. Messrs. Treasure and Son, of Shrewsbury, are the contractors.

The Duke of Portland's seat at Welbeck, near Worksop, has for many years been the scene of buildings above ground on an extensive and magnificent scale, and burrowings below equally extensive and remarkable. The eccentric duke is now said to consider the work finished, with the result of discharging a large number of hands; 250 navvies were discharged on Saturday last, and there are now but 600 men on the estate, whereas till the present summer there were from 1,500 to 1,600. The duke is said to be now turning his attention to his Scotch estates, where large works have been commenced under his supervision.

At the meeting of the central committee of the Carlisle Diocesan Church Extension Society, held on the 24th ult., the following grants were voted:—Great Salkeld, £50 towards restoration and rearrangement, to be carried out at a cost of £480; Kirkoswald, £50 restoration, involving expenses of £1,425, and Skelton, £60 alterations, at outlay of £550.

At the Kent county sessions the resignation of Mr. Bulmer, the county surveyor, was accepted. Mr. George Ruck was appointed to the vacancy at a salary of £300 a year.

The church of All Saints, Goxhill, has been reopened after restoration, carried out at a cost of £2,500, from the designs of Mr. James Fowler, of Louth. The contractor was Mr. T. Hopkinson, of Retford.

New Board Schools in Brighton-road, Horsham, were opened on Saturday week. They are in three departments under one roof—a class-room being attached to each of the principal rooms. A master's residence is in course of erection adjoining the schools. The total outlay is about £4,500. Accommodation is provided for 400 children. Mr. J. Livock, of Gower-street, London, is the architect. The contractors are Messrs. H. Rowland and Son, of Horsham.

The annual distribution of prizes and certificatse to the students of the Redruth Schools of Science and Art took place on Thursday, the 31st ult. The report showed satisfactory progress on the part of the students, and that 67 prizes and certificates had been gained in the South Kensington local examinations.

Our Office Table.

On Saturday evening Mr. Hubert Herkomer delivered a lecture to a large audience in the hall of the Liverpool Free Public Library, on "Art." Mr. P. H. Rathbone, chairman of the library, museum, and arts committee, presided. Mr. Herkomer at some length insisted upon the alliance of true art with nature, and maintained that a mind which was innately an art mind, would, by studying nature, feel irresistibly the desire to imitate it by some means or other so as to fix it and make it comprehensible to other minds. Nature thus naturally led man to art, and art must in its turn lead man to a clearer sense of his surroundings and his duties and obligations to the Mind that planned all that is. Art should be one of religion's mighty voices; it should sing praises of God's works, should lead man to his God, and should bring man to God; for was it not the aim of creation that man should be in God and God in man? In his concluding remarks he mentioned several points to be remembered, and amongst them "Let us conquer prejudice instead of allowing prejudice to conquer us;" and with reference to this, he said he hoped that in Liverpool they would follow the example of Sir Coutts Lindsay and Mr. W. L. Thomas, and open their galleries to the public on the Sunday free, and thereby clear the street corners of idle men who did not know what to do with themselves, every place but the public-houses being closed to them, even the churches. Mr. Herkomer was also entertained at dinner by the Liverpool Art Club on Monday night, when he urged that it was within their reach to make the town a great centre for art students. Every year a painters' festival should be held in Liverpool, to which all the leading artists should be invited to come and work for eight or ten days. Students, he said, would learn more at such annual conferences than by years of work without such aid. The idea was warmly applauded.

Mr. Ruskin's "Guild of St. George"—an association which "proposes to determine and institute in practice the wholesome laws of laborious (especially agricultural) life and economy, and to instruct, first the agricultural, and as opportunity may serve, other labourers or craftsmen, in such science, art, and literature as are conducive to good husbandry and craftsmanship, for which purpose the association takes power to erect schools, museums, and other educational establishments," was registered on the 25th ult., as a company limited to £5 each, with special licence from the Board of Trade to omit the word "limited" from the title in consideration of the income of the company being devoted solely to the carrying out of the objects, and not for profits. The members of the association will be termed guildsmen and guildswomen, and the roll of the guild will be kept at Corpus Christi College, Oxford, or elsewhere, as the members may direct. The subscribers are eight in number, one being a lady, and another Mr. J. H. Chamberlain, architect, of Birmingham. The management of the guild is vested in the master, the first occupant of that office being Mr. John Ruskin.

In a letter published on Tuesday in the *Western Mail*, the Rev. E. A. Fishbourne, of Llandaff, mentions the addition of carved figures to the stalls in the cathedral, and other improvements now in progress, under Mr. Prichard's supervision, and pleads for the completion of the work of restoration at this cathedral. This includes the erection of a *flèche* to break the long line of roof at the junction of nave and chancel; the raising of the Lady chapel roof; the addition of enriched parapets and niched parapets above the presbytery clerestory; the decoration of presbytery; stained glass for western windows and the Lady chapel; and a new and adequate organ. All these works contemplated by the dean and chapter could, Mr. Fishbourne declares, be carried out for about £4,000.

The annual meeting of the Birmingham Master Builders' Society was held on Monday afternoon, at the Great Western Hotel, under the presidency of Mr. J. Garlick. The report stated that, although the committee could not

this year congratulate the meeting upon the brisk state of trade which had existed for several years previously, they could, in consequence of the pressure for work being less, congratulate them upon the continued removal of many of the difficulties in obtaining the necessary number of operatives to carry on the work more expeditiously. During the year the National Association of Master Builders of Great Britain had been formed, with which the association, together with thirty-three other towns, had been affiliated; and the committee looked forward with confidence, not only to its being the means of giving a great check to any unreasonable demands made by the operatives throughout the kingdom, but of affording valuable assistance to local associations in case of strikes. Although the trade had again been free from disturbances, there had been demands and strikes in many towns throughout the country, but in each town, except two, the operatives were compelled to withdraw. After an allusion to the death of Mr. Jeffrey, the late secretary, the report stated that the total receipts for the year were £153 6s., which added to the balance from last account of £87 13s. 6d., made a total of £240 19s. 6d., and the various disbursements to £123 10s. 3d., leaving a sum of £117 19s. 2d. to the credit of the association. Mr. Garlick was re-appointed president, and Mr. W. H. Parton was appointed vice-president. The other officers and committees were re-appointed.

The Reform Club House, Pall-mall, is undergoing decoration in completion of the scheme of Sir Charles Barry, the architect of the edifice. That scheme embraced a polychromatic treatment of the grand vestibule or cortile and the principal apartments, and we observe considerable progress has been made. The vestibule, which forms so conspicuous a feature, is of two orders, and comprises three intercolumniations in its length. Above it rises a domical roof or lantern of glass of an ornamental pattern. We notice that the columns are being finished in Sienna marble, and the entablature is being coloured in accordance with some of the best Italian examples, though it is hardly advanced enough to enable us to judge of the ultimate effect. This very beautiful part of Sir Charles Barry's work long lacked colour to give it the full effect intended. The library, the finest apartment of the Reform, with its grand bays and projecting columns of the Corinthian order, its deep coved ceilings and rich panellings will probably be the *chef d'œuvre* of the interior, and we hope when the work is a little more advanced to give our readers a more critical description of the work. The decorations are being carried out under the direction of Prof. E. M. Barry, R.A. Messrs. Verity Bros. have the contract for the new ventilating arrangements.

Messrs. Cox and Sons have recently supplied to St. Mark's Church, Myddelton-square, London, a font of very fine design. The body is of Caen stone, octagon in shape. On four sides are sculptured the evangelistic symbols in high relief. The other four sides, which are smaller, are occupied by panels of rich foliage. At the angles of the octagon are small pillars of coloured marble. The shaft supporting the body of the font is formed by a cluster of four columns, also of coloured marble, the capitals being elaborately carved, as is also the cornice at the top of the bowl. Messrs. Cox and Sons have also executed a fine eagle lectern of polished brass for the chapel of the Royal Naval Hospital, Greenwich. This was exhibited at the church congress recently held at Sheffield, and elicited much favourable notice. The design of the lectern has been carefully studied, so that it may harmonise with the architecture of the chapel. The pillar is richly moulded and enriched at intervals with foliage of a classical character. The ball on which the eagle stands is also supported by foliage of a similar type. The care with which the classical feeling has been preserved is worthy of notice.

So much public interest has been taken in the restoration of St. Alban's Cathedral that, as one of the architects, Mr. John Oldrid Scott sends for publication a few lines on a matter which is one of very real importance. He says: "Now that we have decided finally to recover the ancient high form of roof—and I am confident that the decision is a right one—this point arises:—The roof will no longer be an invisible one; what shall its external covering be? I do not think there can be any doubt that lead should be used, as being the traditional roofing material for all dignified buildings, the best in appearance, and the best practically. Like all other good things, however, it costs money, and the fund in the hands of the committee being barely sufficient for what has to be done, the additional cost of lead over an inferior covering, amounting to about £1,700, becomes an important consideration: so much so, indeed, that unless this sum is forthcoming within the next four or five months, the nave of this grand old building will of necessity have to be covered with slates or tiles—both, no doubt, good enough materials in common cases, but both quite unworthy of St. Alban's Cathedral."

CHIPS.

The vestry of St. James's, Westminster, considered on Thursday week three tenders for laying down wood pavement in Pall-mall, from the Asphalte Wood Pavement Company, the Improved Wood Pavement Company, and Lloyd and Company. That from the last-named firm was accepted.

A new tower has been added to St. Peter's Roman Catholic church, Lytham. It rises to a height of 73 feet and is 15 feet square, with angle buttresses and battlemented parapet. Mr. James O'Byrne, of Liverpool, was the architect, and the chief contractors were—for masonry, Messrs. Stothe and Bennett, of Lytham; brick work, Mr. T. Singleton, Kirkham; and timber work, Mr. J. Colinson, Lytham. The carving was executed by Mr. J. Sherratt, of Preston, this including a life-size stone figure of St. Peter, placed beneath a canopy, above the north entrance. At the same time the west gallery has been enlarged by 50 sittings. The total cost has been £1,400.

Works of sewerage were completed last week in the new township of Skelmersdale, North Lancashire. The work has been executed from the plans of Mr. G. H. Roberts within the estimated cost of £1,000. Mr. Blundell was the clerk of works.

Infirmary and laundry buildings are in course of erection for the Staines Board of Guardians, from the designs of Mr. Judge. Mr. Boyce is the contractor.

The memorial stone of a Baptist tabernacle for the Rev. W. Cuff has been laid in Hackney-road, Shoreditch, on site of former chapel. The new building will seat 2,000 persons; and ground has been acquired on which to erect at some future time school buildings. The style is Lombardic, the facing materials being red bricks with stone dressings. The interior will measure 120ft. by 80ft., and will be surrounded on three sides by a gallery, the platform occupying part of the fourth side. Mr. T. Lewis Banks is the architect, and Mr. Josolyne, of the Borough, the builder. The cost of erection will be between £28,000 and £29,000.

Plans prepared by Messrs. Henderson, of Truro, for the sewerage of Camborne, have been adopted by the local board of that town, subject to the approval of the Local Government Board.

The death of Mr. Charles Clark, a well-known builder of Hastings, took place on Sunday. The deceased, says the *Sussex Daily News*, was a somewhat eccentric character.

It was reported at the last meeting of the Marylebone vestry that the wood paving of Oxford-street, from Regent-circus to Tottenham-court-road, has been completed at a total cost of £5,862 5s. The work was entirely done by the parish workmen.

The new municipal buildings at Cardiff, in course of erection from the designs of Messrs. James, Seward, and Thomas, of that town, are approaching completion. The new police-court and magistrates' clerks' offices were opened for use on Wednesday, and the mayor's banquet is to be given in the assembly-rooms and served from the kitchens in basement to-morrow. We illustrated the buildings, which are Renaissance in character, and will cost about £44,000, on April 20 and Nov. 9, 1877, and April 26 of the present year.

St. Mary's Church, Chastleton, was reopened on Thursday, 31st ult., by the Bishop of Oxford. The gallery has been removed, the pews in nave replaced by low oak seats, oak panelling and panelled oak roof placed in south chantry—the Jacobean pulpit (which bears the date 1625), re-erected on stone base, and lectern added. A number of old tiles have been found under the pews, and they have been relaid in a part of the church where they will be seen but not much trodden upon. A new piscina has been placed in chancel. The work has been carried out from the designs of Mr. C. E. Powell, of London, by Messrs. Groves, of Milton, at a cost of £900.

The Sheffield Town Council have decided to borrow a further sum of £300,000 for street improvements.

A new rifle volunteer hall, erected in Church-street, Buckie, Banffshire, was opened on 25th ult. The street front is Gothic in character, of freestone, with projecting dressings. On either side of the main entrance is a shop. Behind is the hall, 60ft. by 30ft., with stage at further end, 20ft. by 10ft., and 3ft. high, communicating with retiring rooms. The seating capacity is for 600 people. The whole of the woodwork is of pitch pine; the walls are decorated with stencil patterns. The designs were prepared by Mr. Perry, of Buckie. The chief contractors were Messrs. Alexander, for masonry, and Hendry for carpentry. The cost of erection was £1,400.

An additional story is being adde to the premises of the Metropolitan Board of Works in Spring-gardens. It is uniform in character with the present cement-faced Palladian structure, and the cornice will be 70ft. above the pavement. The increased accommodation thereby provided will be divided into twelve offices and three strong rooms, with a corridor 6ft. wide in centre. The work is being carried out by Messrs. Hook and Oldrey, of Woolwich, from the designs of Mr. George Vulliamy, architect to the board. The contract was taken at £5,600.

The Town Council of Weymouth have been pressed by the Local Government Board with reference to alleged nuisances arising from the Backwater, upon which the board had received complaints from several residents. The matter was discussed at a meeting of the town council last week, when the prevalence of stenches was generally admitted, and was attributed by some to accumulation of seaweed, and by others to the discharge of sewage into the harbour. It was resolved to employ a scientific gentleman to examine into the matter.

A new Wesleyan chapel has been opened at Brook-road, Isle of Guernsey. It is cruciform on plan, and of an early type of Decorated Gothic in style, a prominent feature being a tower and spire, which rise to a height of 112ft. The internal measurements are 72ft. by 45ft., exclusive of vestries in rear. Galleries surround three sides of the building, and there are in all five distinct entrances to the chapel. 800 seats are provided. The rostrum is planned to seat six persons. All the windows are of stained glass. A clock with three dials and striking quarter chimes is about to be placed in the tower as a special gift. Messrs. Wilson, Willcox, and Wilson, of Bath, are the architects, and Mr. D. C. Jones, of Gloucester, the contractor.

On Tuesday week Mr. James Bain, contractor for the St. Andrew's harbour works, was killed on the railway between Leuchars junction and St. Fort.

The Newport, Monmouthshire, board of guardians have instructed Mr. A. O. Watkins to draw plans for alterations to Caerleon Industrial Schools.

The Retford rural sanitary authority last week elected Mr. William Spencer, of Clarborough, surveyor and inspector of nuisances at £60 a year.

The memorial stone of the nave of St. Barnabas Church, in Mill-road, Cambridge, was laid on Saturday week. Mr. W. Smith is the architect, and Mr. F. Thoday the builder. The present contract is for £1,800, and is for the erection of three out of a proposed four bays of a nave. A further scheme is to add aisles, but at present the arcades will be filled in with brickwork.

New Board Schools at Henllys were opened on Thursday week. The buildings are in three departments, built of sandstone, quarried in the immediate vicinity, in range work, with joints rubbed in, and the whole of the beds inclined outwards. These precautions to secure dryness are necessary, as the site is very elevated. Freestone is used for dressings. The whole of the woodwork is pitch pine, the wrought portion being stained and varnished. The works have been carried out by Messrs. W. Jones and Son, contractors, Newport, Mon. from designs and under the supervision of Mr. E. A. Lansdowne, also of Newport.

Mr. Francis Philip Cunliffe Owen, director of the South Kensington and Bethnal-green Museums, has been gazetted a K.C.M.G. for services at the Paris Exhibition.

A new organ chamber has been opened as an adjunct to St. Stephen's Church, Ipswich. It is 13ft. by 7ft. internal dimensions, and opens on north side of chancel. The exterior is of small whole flints, and the roof is tiled. On either side of the arch into chancel are inscribed memorial brasses, executed by Messrs. Hart and Co., of London, from special designs supplied by the architect, Mr. E. F. Bishopp. Messrs. J. B. and F. Bennett were the general contractors, Mr. Chinnock doing the stone masonry work and Mr. Coe the hot water apparatus.

Mr. James Barton, of 370, Oxford-street, W., has just completed the fitting up of the interior of an extensive range of new stable buildings for J. H. Morrell, Esq., Headington Hill Hall, Oxford, in a most complete manner. The range of buildings is extensive and handsome.

The School Board for Ilkestone, at their last meeting, selected a plot of ground in Charlotte street, Ilkestone, as the site for new schools, and instructed Mr. A. H. Potter, architect and surveyor, of Mansfield, to prepare plans for the same.

New class-rooms added to Water'oo-street Congregational Sunday Schools, Camberwell, were opened on Sunday. They have been built from the plans of Mr. Howard, by Mr. Stephens, of Camberwell.

New board schools are being erected in Church-street, Sandiacre, from the designs of Mr. W. Knight. Mr. Lowe, of Long Eaton, was the contractor.

The parish church of St. Michael, Sutton Bonnington, was reopened after restoration on Friday. The work has been carried out under the direction of Mr. Dalby, architect, of Sutton Bonnington, by Mr. Allen, builder, of Leicester.

Plans have been prepared by Mr. Drummond, C.E., for the drainage of the town of Fleetwood. The estimated cost is £17,000. The scheme has been approved by the Fleetwood urban authority, subject to the sanction of the Local Government Board.

The churchwardens of the parish of SS. Simon and Jude, Norwich, appeared on Saturday before the magistrates in answer to a summons from Mr. P. P. Marshall, city surveyor, charging them with neglecting to take down or repair the tower of the parish church, the same being ruinous and dangerous to passengers. The case, which was laid under Sec. 75 of the Towns Improvement Clauses Act, 1874, was adjourned for 14 days, it being stated that the works of repair had been commenced.

A new Congregational chapel at Fore-t-green, Abinger, was opened on the 30th ult. Messrs. King, of Abinger Hammer, were the builders; the cost was £600.

At a meeting held at Brentwood, Essex, last week, Mr. Ernest G. Lee submitted plans for the reconstruction in sections of the unsightly modern Church of St. Thomas. These provide for the extension of the present church laterally, to form a new aisle, and the erection of a new nave and chancel with vestries. The new buildings, as proposed, would seat about 1,000 adults, all on the ground level, and will cost about £8,000. The new scheme was approved, and it was decided to erect the new chancel first.

At Gwersyllt, near Wrexham, memorial stones of a new Calvinistic Methodist chapel were laid on Monday week. The building will be constructed of Moss Valley stone, with pitch-pine sittings for 200 persons; the estimated cost is £600. The architect is Mr. Fraser, Rhosfon, and the contractors are Messrs. Williams, Llewelyn, and Williams, builders, of Southsea.

The Duke of Westminster last week laid the foundation stone of a Welsh church at Mold. The church, as designed (Mr. John Douglas, of Chester, being the architect, and Mr. Charles Holland, also of Chester, the contractor), will consist of a nave, chancel, and organ chamber, and it is intended, when funds will permit, to erect a tower and spire at the north-east end of the building, but at present it is only proposed to erect the tower to the height of one story. Accommodation will be provided for about 290 people. The style of the design is Early Pointed, and the walls will be of local stone, with red Helsby stone dressings.

A new cemetery was consecrated at Workington on the 31st ult. The chapels and other buildings have been designed by Messrs. Chas. Eaglesfield and Co., of Maryport.

The Bishop of St. Alban's, in his primary visitation charge delivered last week in the cathedral church, mentioned that during the past five years 16 new churches had been consecrated, and no fewer than 80 restored in the diocese.

The new bells in St. Peter's Roman Catholic Church, Leamington, were blessed on Tuesday week. The new tower in which the bells are being placed is in the 13th-century style of French Gothic, and has been designed by Mr. Henry Clutton. Mr. Gascoyne, of Leamington, has carried out the work. The same builder also erected the church 15 years since under Mr. Clutton's direction.

The Wesleyan chapel at Newquay, Cornwall, was opened on Friday after enlargement, including lengthening, the addition of north and south transepts, and of an apse behind the rostrum for the reception of an organ. 130 additional sittings have been provided, and gas has been laid on. Mr. Silvanus Trevail was the architect, and Messrs. Ennor, Buller, and Carne the contractors. The cost has been about £650.

The Lord Lieutenant of Staffordshire, on Monday, opened an exhibition at Stafford of pictures, pottery, statuary, articles of vertu, and other works of art, in aid of the Schools of Art and Science. The exhibition contains above 300 paintings, including many by the old masters, contributed by people of the county; the rest are by modern artists. The Staffordshire fine-art pottery is well represented, as is also that of Worcester and Lambeth.

The Queen has ordered a monument to be erected at Balmoral to the late Sir Thomas H. Biddulph. Messrs. Macdonald, Field, and Co. have been entrusted with the work. The monument is to be a grey granite Celtic cross, about 12 ft. high, with polished ornaments and letters on front.

On Sunday last Mr. Kenneth Macleay, R.S.A., died in Edinburgh, at the age of 76. He stood in high repute as a miniature painter, and before the introduction of photography he painted on ivory with great success. Mr. Macleay was the last of the original members of the Royal Scottish Academy, established in 1826. He was for a long period one of the visitors of the Life School, and likewise an auditor and trustee of the Academy.

The foundation stone of a new mission church for the districts of Hopetown and Loscoe, at Normanton, West Riding, was laid on Monday week. The building will be of brick, with stone facings and dressings, and blue slated roof, and will measure 68ft. by 22ft., and 24ft. in height. The woodwork is of stained pine, except the roof, which is of pitch pine. The cost is estimated at £550, and seats are to be provided for this sum for 250 persons. Mr. Thomas Leake, of Normanton, is the architect, and Mr. Robert Leake, of the same town, the builder.

A coffee public-house in Windsor street, Chertsey, is being built by Mr. R. J. Hunt, contractor, for a limited liability company. It will contain a coffee-room and reading-room, each 27ft. by 19ft., and smoking room, 27ft. by 16ft.

Sunday-school buildings at Ridge Bank, Halifax, were re-opened on Sunday week, after the execution of alterations and additions, effected at a cost of £160. Messrs. Leeming and Leeming, of North-gate-chambers, Halifax, were the architects; Mr. G. Parker carried out the masonry contract, and Mr. T. Tuley the joinery.

Crynant Church, near Cadoxton, Glamorganshire, was reopened on the 29th ult., after rebuilding. It was falling into complete ruin when Mr. J. T. D. Llewellyn, the high sheriff of Glamorganshire, undertook to restore and refurnish the edifice.

At Aberystwith on the 31st ult., foundation stones of a new Welsh Wesleyan chapel were laid. The new building will seat between 800 and 900 persons, and will cost, with site, £4,000. It is to be Romano-Corinthian in style, and will measure 72ft. by 40ft., and 32ft. high to ceiling. The architect is Mr. Walter W. Thomas, of Liverpool, the builder Mr. Thomas Jones, of Do'e.

New grammar school buildings are in course of erection at Thetford, Norfolk, from the designs of Mr. Edward Boardman, of Norwich. Mr. Hubbard is the contractor, and Mr. Edwin Stafford the clerk of works. The stonework sub-contract has been taken by Messrs. Peck and Sons, of Thetford.

The parish church of Walwyn's Castle, Pembrokeshire, was reopened on Friday, the 25th ult., after restoration, carried on during ten years past. The architect, under whose superintendence the earlier works were done, was the late Mr. F. Wehnert, who has been succeeded by Mr. W. H. Lingen-Barker, of Hereford.

Mr. Gibson has been asked to report on St. Mary's Church, Warwick, with a view to its restoration.

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MEETINGS FOR THE ENSUING WEEK.

MONDAY.—Institution of Surveyors.—Opening Address by William Sturge, President. 8 p.m.

TUESDAY.—Institution of Civil Engineers. Papers by J. B. Mackenzie, M.I.C.E., on "A Monolith Dock;" by T. R. Salmond, M.I.C.E., on "The River Lagan and Harbour of Belfast;" and J. E. Williams, M.I.C.E., on "Whitehaven Harbour and Dock Works." 8 p.m.

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READE BROTHERS, Tower Varnish Works, Wolverhampton, respectfully invite attention to their Varnishes for House Painters, Decorators, and Builders, which will be found of uniform excellence, and for durability, lustre, and general all that can be desired. They would direct special attention to their Extra Hard-Drying Varnishes for churches, and seats of schools and public buildings, which for hard-drying, brilliancy, and wear are unsurpassed.

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"It seems to meet the end in view more nearly than anything we have seen yet."—*The Field.*

"The patent has given high satisfaction to every one using it."—*The Christian Union.*

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Trade News.

WAGES MOVEMENT.

AYR.—The Ayr master masons have agreed to reduce their men's wages from 8d. to 7½d. an hour. Although trade is dull, the new town hall and academy will give work to a large number of men.

BANBURY.—At a meeting of master builders last week, Mr. A. Kimberley in the chair, it was unanimously agreed that, owing to the depressed and stagnant state of the building trade, a reduction of 1d. an hour should be made in carpenters' and joiners' wages, and a corresponding reduction upon all other mechanical branches of the trade. A reduction of ½d. per hour will be made in labourers' wages. The new scale will come into operation not later than Saturday, the 30th inst.

BLACKBURN.—The master builders of Blackburn and district have given notice to reduce the wages of their workmen 2s. per week all round. Resistance to the reduction has been resolved upon.

FORFAR.—The journeymen masons employed in Forfar came out on strike on Saturday. The employers intimated that they intended to reduce the rate of wages from 7½d. per hour to 6½d. per hour, and also that wages would be henceforth paid fortnightly. To these changes the men object—hence the strike.

GLASGOW.—Some time ago the master masons of Glasgow intimated to their workmen a reduction of wages of 1d. per hour. An amicable arrangement has been made by which the men accept a reduction of ½d.

HALIFAX.—At a meeting of master joiners, on Tuesday week, it was decided to give the operatives six months' notice of a reduction of wages.

KELSO.—It has been agreed among the master joiners in Kelso to reduce the wages from 7d. per hour to 6½d.

WELSH SLATE QUARRIES.—At the Penrhyn, Llanberis, and other large quarries in North Wales, the "bargains," or contracts taken by the workmen, were on Tuesday let at a reduction averaging from 20 to 25 per cent. The reduction was necessary, owing to the accumulation of stocks and the dulness of the trade, which, it is said, is in some degree traceable to the importation of American slates, and the North Wales Quarrymen's Union advised its adoption by the men, who were in favour of shortening the hours of labour. At the Rhos quarry, Bettws y Coed, the strike has now extended over 15 weeks.

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TENDERS.

BERMONDSEY.—For a new boiler at Bermondsey Workhouse for the St. Olave's Board of Guardians:—

	Low Moor iron.	Staffordshire iron.
Bone, Long-lane	£446 0 0	... £350
Cotton & Sons, Whitechapel	440 0 0	... 410
Grainer	418 0 0	... 378
Marshall, Whitechapel ...	390 0 0	... 345
Middleton, Southwark (acc.)	344 10 0	... 340

BETHNAL GREEN, LONDON.—For steam engines, laundry machinery, and fittings at the workhouse at Bethnal Green. Messrs. A. and C. Harston, architects, 15, Leadenhall-street, E.C.:—

Clements and Co., London (accepted)	... £2,505
For steam boilers, &c.:	
Fraser Bros., Bromley (accepted) ...	... 970

CAMBRIDGE.—For the erection of new wards at the workhouse for the Cambridge Board of Guardians. Mr. Bays, architect:—

Saint, J., and Son, St. Ives	... £1,488
Wilson, J., and Son, Histon... ...	... 1,474
Denson, J. R., Cambridge	... 1,395
Clark, F., Dover	... 1,250

EASTBOURNE.—Tenders for crossings for the Local Board. Mr. Charles Tomes, town surveyor:—

	Stone.	Wood.
Gabriel, J. S. ...	34s. 8d.—34s. 8d.	... 25s.
Booth & Wheeler	33s.—28s.—27s.	... ——
Hewitt, N. ...	30s.	... ——
Mace, T. B. ...	——	... 47s. 9d.
Asphaltic Wood Co.	——	... 34s.
Lloyd and Co. ...	——	... 27s. 6d.
Improved Wood Co.	——	... 24s.
*Nayward, James	28s. 7d.—22s. 10d.	... 42s. 7d.

* Accepted at 28s. 7d.

GLOUCESTER.—For works in Widdin-street for the Town Council:—

Meats Bros.	... £590
Ravenhill, W. E.	... 537
King, A.	... 518
Lewis Bros	... 473
Griffiths, H	... 355
Meredith, J. (accepted)...	... 334

HAMMERSMITH.—For 1,200 feet of 3ft. × 2ft. half-brick sewer in Blomfield-road, Hammersmith, for the Fulham District Boards of Works. Mr. Alfred Cubitt Bean, engineer:—

Williams, Son, and Wallington ...	... £1,250
Mears	... 1,237
Rowley	... 1,185
Keeble and Co.	... 1,136
Hale	... 1,105
Taylor	... 1,035
Mears	... 1,005
Strachan and Co.	... 991
Thompson and Co.	... 987
Ford and Norris	... 967
Alldred	... 958
Coat	... 950
Serff	... 898
Matthews	... 885
Hancock, jun.	... 815

[Engineer's estimate, £1,142.]

KEA, WEST CORNWALL.—For the building of new schools in the Falmouth-road for the Kea School Board. Mr. James Hicks, Redruth, architect:—

Michell & Odgers, of Scorrier (accepted) ... £595

[Eight tenders received.]

KENWYN, WEST CORNWALL.—For enlarging the schools at Chacewater by 120 school places for the Kenwyn School Board. Mr. James Hicks, of Redruth, architect:

Michell and Odger, of Scorrier (accepted).

LLANELLY.—For reservoir embankment works for the Local Board of Health of Llanelly:—

Mercer and Lintott	... £118 10 0
Jones, Samuel (accepted)	... 90 0 0

LONDON.—For new offices for the Submarine Telegraph Co., Throgmorton-avenue. Mr. John Norton, architect; quantities by Mr. S. J. Thacker:—

		Saving if ordinary flooring.
Bywaters and Sons	... £19,760	... £710
Trollope and Sons...	... 19,370	... 1,000
Lucas Bros... ...	... 19,240	... 875
Holland and Hannen	... 18,958	... 890
Braid and Co. ...	... 18,324	... 1,018
Peto Bros.	... 17,792	... 1,047

PORTSMOUTH.—For building a chapel at the new lunatic asylum for the Portsmouth Town Council:—

Evans (accepted) £2,550

THAME.—For sundry repairs, painting, and decorating, at 13, High-street, Thame, Oxon., for Mr. W. R. Sutton. Mr. Horace Jardine Heath, architect:—

Barton, George, Thame (accepted).

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THE LAST CHANCE SILVER MINING COMPANY of UTAH (Limited).—FINAL ISSUE of DEBENTURES of £10 each, bearing Interest at 15 per cent. per annum.—ONE HUNDRED and FIFTY are now OFFERED for SUBSCRIPTION, £3 payable on Application, £3 on Allotment, and the balance two months after allotment. Efficient machinery is now erected and in thorough working order, and from the latest advices received from the Chairman at the Mines will be rai-ing ore within a very short time. From the recent discoveries of Gold in the adjoining mines, now being worked with great success by large Californian capitalists, and which veins exist in these Mines, the Chairman is confident of speedy and great results. The present issue is for the purpose of furnishing winter supplies. The Debentures are fully secured, being a first charge on the Mines and other property of the company.—Forms of Application and full information can be obtained on application to the SECRETARY, at the Offices of the Company, 2, Great Winchester-street, London, E.C. The Debenture List will CLOSE on THURSDAY, the 14th November inst.

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THE BUILDING NEWS.

LONDON, FRIDAY, NOVEMBER 15, 1878.

ART LECTURES AND DISCUSSIONS.

THE architectural session commences under circumstances the reverse of auspicious. The opening meeting of the Association last Friday, however, drew a fair audience, and Mr. Florence's address—an abstract of which will be found elsewhere—presents a few points for consideration. Mr. Florence viewed the architect's education under the threefold aspect of its effect upon him as a business man, a man of science, and an artist, and gave some good advice to students upon the importance of making themselves something more than proficients in drawing or mere professional men, only able to talk upon matters connected with their immediate calling. The occasional applause which greeted the lecturer showed that his remarks were appreciated, but we hope the appreciation is something deeper than a lecture-room impression. Our observation has confirmed the conviction that those who go no farther than attend lectures are seldom real students. Persons who will not read for themselves will never be taught by lectures, and we agree with Lord Rosebery's remarks the other day at the Edinburgh Literary Institution, that lectures have been rather overrated as a means of education. In such a practical art as architecture the student must not mistake lecturing for learning. It is true there are many who will not instruct themselves, and these are the individuals for whom lectures are necessary; as there are many persons to whom knowledge cannot be brought in any other way. As regards the classes of the association, we place more faith in those which encourage discussion; but then the discussions must not be regarded as mere occasions for display of talking power and rhetorical fencing. The President properly urged the importance of members "getting up" the subject of discussion, so that it may have a practical bearing. Without this the remarks made degenerate into twaddle. Young architects have in their practice to attend upon clients, and discuss the expediency of their projects with committees and boards; hence the value of acquiring a facility in expressing themselves with clearness on matters of detail and taste. The very essence of this acquirement is a wide view of any particular subject, and a general knowledge of business and the world. One part of Mr. Florence's address touched upon the absolute advantage a general acqaintance with literature afforded, and he might have strengthened the idea of the importance to be derived from such knowledge by mentioning the education given now to young engineers intended for colonial service. The advice given by some—that drawing was the *summum bonum*, the aim and end of the architect's training—is beginning now to be regarded by the better informed of young men as a very misleading, if not fatal mistake. The artist's taste and pencil-power should, of course, be the object of every young architect who aspires to any position in the profession, but such a power can never be purchased at the expense of real culture or practical knowledge; and we think the fact is much too often overlooked that the artistic instinct is a thing totally independent of a facile use of the pencil. In fact, the example of our greatest architects of the present century may be cited to show that it has been rather the critical discernment of good taste, and the ability to give expression to a building, that has been the test. The late Sir Charles Barry and Sir Gilbert Scott were men who never had a tithe of the drawing facilities and practice common in the present day. They could doubtless draw and express themselves artistically upon paper, but we know they never became famous as draughtsmen. The danger in front of the expert draughtsman is that so often he becomes a downright copyist; he is nearly always more or less of a "crib," and a recent writer on art, M. Véron, has cleverly noticed that the general sketcher's work is always more successful than that of the laboured artist.

The weakness of the designs contributed to the classes is attributable largely to the want of a general culture in other departments. It is obvious that most students under the present pupil system of education become imbued with the beauties of one mode of design—perhaps it is Gothic, or some mixed style—while the study of the only one capable of imparting a critical taste and method—the Greek or Italian—is neglected entirely. Under the French academic training, though there is certainly less vigour and originality, we get the compensating advantage of a more grammatical knowledge of any style, which, as the President remarked, made the student more self-reliant and certain of the principles upon which he was working than he could possibly become under the pick-up system. In truth we believe the right way of teaching design is to adopt a course between the French and English—to instruct the student in the principles of Classical and Gothic design, and give him a free choice of models, and after this to leave him to his own resources. In brief the discipline of the French routine, and the freedom of the English, are equally necessary. A very warped and stunted idea of designing must be that of the student who first begins to think in a style the elements of which he has merely picked up amid the miscellaneous duties usual with pupils in architects' offices, and we know perfectly well what the average kind of work done in this way is. There is a coarseness in it—nothing refined or delicate—and we can at once perceive the difference between the architectural design of the English school and that of our neighbours across the Channel. It was said the other day that the tendency of English architecture is to become clumsy—that of France to become frivolous. There may be some truth in Professor Kerr's remark; but the tendency of the recent efforts to revive Old Stuart has shown certainly something bordering on the frivolous as well as the coarse and clumsy.

Mr. Florence touched upon the necessity of a student studying general literature, and some remarks were made at the conversazione the other day by Mr. Blashill upon the difficulty of getting essays from the members of the Association. We should certainly like to see the essays taken up by young architects more than they are, for their neglect indicates too plainly the dearth of original thought and self-study. Drawings and sketches are perhaps more captivating—they appeal to a larger class—but the essay is a better test of knowledge and self-reliance. The Institute essay generally goes begging; there is seldom any competition for it—possibly because the inducements are not tempting enough. Be this as it may, we think the Association would be doing well to encourage criticism and general culture by discussions and essays upon a systematic course of study. A lending library of 900 volumes is a good inducement to begin, and if a little of the energy and zeal displayed in the annual sketching excursion were imported into the cultivation of the subjects of professional education we should find the essay prize sought after with greater avidity. The sketch-book has been a source of much strength and encouragement to young members; the classes of design and construction have been inestimable boons; the visits have been of unquestioned value; but they have yet been insufficient to give the young architect reliance upon his own knowledge and resources. They have made him a practical draughtsman, but not an architect, nor still less a man of business.

There are some reasons why the younger men of the profession should take the place of the elder in the work of education. The fact is, architects in practice, the great men in the profession, have no time, and are not disposed even, when a given subject has been chosen for them, and a month to prepare it has been allowed, to sit down and write a voluminous paper to be read at a professional society; they are rather more inclined to listen than to read, and after all the self-imposed task is not, unless it be to vindicate a hobby, very congenial. Nor are we quite sure that men in large practice are the best qualified to instruct or entertain others; they are seldom fond of methodising their experiences for the benefit of their brethren. Not that the practical man has not something fresh to say and to impart, but he says it in a less interesting manner than one who has had leisure to consult the opinions of others, and he is generally far more opinionated in what he does say. But there is a large, and we may add growing, class in every profession who devote themselves to the literature of their avocation, who have more leisure, and upon whom the secretaries of learned societies rely for aid. They are, perhaps, men of moderate or small practice, but who are nevertheless better fitted both mentally and by education to instruct. If they have not the practical knowledge of work and business of some of their seniors, they can take a wider view of many facts and principles than he who has had little time to collect and arrange. They have this farther and indubitable advantage: they can take a more independent view of the subject, and can, with less difficulty, regard the work of the profession from an outside or public stand-point.

THE INSTITUTION OF CIVIL ENGINEERS.

THE Council of the Institution of Civil Engineers has not been very successful in its attempted solution of the difficulties which have engaged the attention of the members of the Institution during the past two years. Those interested in the matter know that—thanks to the disregard by successive councils of the charter of the Institution, so far as it relates to the admission of Associates—the complete disorganisation of the Institution has been very nearly accomplished. The Institution was originally intended to consist of professional "Members" only, and a non-professional class of "Associates." It really consists at present—first, of properly-qualified members, distributed between the "Member" and "Associate" classes; secondly, of members who are engineers, but are entitled to membership according to the bye-laws; and, lastly, of members who are not engineers, and who really have no business in the Institution at all. For a long time past the Council have admitted indiscriminately, as "Associates," engineers and outsiders, and it is now found that a class which was originally intended to have no part in the management of the Institution is legally entitled to full participation in all its corporate rights, and that practically at the present moment its members, if they choose to exert their powers, are the masters of the situation. The scheme proposed by the Council for the rectification of the present unsatisfactory state of things seems to us to have been radically a bad one, and to have altogether deserved the rejection it has experienced. It was pro-

posed to add two new classes of members to the Institution—one to its head, and another to its tail. There were to be "Senior Members" or "Fellows," among whom were to be exalted all Members who had been Members seven years and were willing to pay a heavier subscription for their apotheosis; there were to be Members, similar in all respects to existing Members, save in their newly-created inferiority to their more aged or more wealthy brethren; there were to be Associates, whose position was to be analogous to that of our own Associates of the Institute of British Architects; and there were to be Honorary Members, whose status was to be similar to that of Honorary Associates of the Institute. As a matter of fact, about half the letters of the alphabet were to be appropriated for abbreviations of the titles of the future Members of the Institution, and if the rest of them had been thrown in at random the public would not have been much more mystified. The fatally weak point in the new scheme was the attempt to divide the Members into two classes. If it had been proposed to create an order of Fellows to which only distinguished merit should entitle members to be admitted, something might have been said for the idea, although even in such cases professional men may well be content with pre-eminence out of doors, and remain on equal terms when mixing with their brethren; but that the acquirement of the new dignity should depend on age and a disposition to hand over five or ten guineas extra annually would have been insupportable. That Mr. John Smith, who is really a plumber or a patent agent, but has written "C.E." after his name on his door-plate during seven years of membership, sought originally only as a judicious advertisement, should eagerly pay the price and hasten to use the initials of the higher dignity, while men whose names were household words in the annals of Civil Engineering still remained contented with the lower grade, would have been so absurd as inevitably to bring the Institution into ridicule. Again, what engineer of eminence unconnected with the Institution would be likely to seek admission when he found he could only enter an inferior class, there to remain seven years waiting for full membership?

The proposed alterations, so far as they referred to the "Associates," were nearly as bad as those above referred to. Somewhere about two-thirds of those who are "Associates" at present would have been made "Members," but the change in their position would have really been one of name and not of nature. They would still have simply belonged to the second class, and they are there now practically, and, as it happens, with quite as much real power in their hands as they would possess as Members. Fortunately the scheme of the Council was, as we have said, overruled last week, and it has been finally decided not to create any new class in the Institution, but to face the necessity which exists for altering the existing bye-laws so as to provide for the present unsatisfactory state of affairs. In future it should be insisted on that all elections shall be made in strict accordance with the constitution of the association; that all existing Associates who are really engineers should at once be transferred to the class of Members, and that in future Associates shall be—what it was always intended they should be—persons associated with the engineering profession, but not engineers in the legitimate sense of the word, or as defined by the charter of the Institution. Such seem the simple means by which the present chaotic state of affairs should be satisfactorily terminated. Once adopted it is more than probable that some minor improvements much to be desired might follow. We should doubtless soon see the Council renewed and reinvigorated by fresh blood at more frequent intervals than is the case at present. The proposed election of the President yearly instead of biennially is a step in the right direction, and if a large number of retirements from the Council Board yearly is insisted on, and the elections are managed with less resemblance to those for close boroughs in the days before the Reform Bill, the interests of common fairness and of the Institution will be better served. The results of the recent special meeting are so far satisfactory that they have rendered real improvement possible by upsetting what could not but have proved an altogether insufficient solution of the difficulties of the past, if indeed it would not ultimately have turned out a step further in the wrong direction. The popularity of the Institution out of doors, and the undoubted benefits it has conferred on the profession, in spite of internal difficulties and disputes, are too evident not to make all its well-wishers thankful for the course events have taken.

WEATHERPROOF HOUSES.

THE conditions essential to what may be called comfortable house-building—just now forced upon us by the weather—seem, if not misunderstood, to be wilfully misapplied by some architects and builders. The gospel of true economy has been preached to them with unremitting zeal, but as far as house construction is concerned with little or no good result. We constantly see houses built with the intention apparently of wasting heat and space, and these two fundamentals are considered to be provided for if the grates are not made too deep or large, and the front passages or halls are squeezed to the narrowest proportions. The most commodious of all forms in which a house can be built is a square. Now it must be noticed the builder adopts this shape of house because it saves the expense of outside walling and expensive roofing, and the architect abhors it because it is inartistic. The consequence of which is that the square or bungalow form of dwelling, even in the suburbs of towns, where they are most appropriate, have grown unpopular of late years, more especially since Gothic has been the prevailing style. It is satisfactory to find a return to it, though economy has less to do with the matter than fashion. Now, we believe economical house-building near all large towns must ultimately adopt the square or rectangle. But there is something more in the square plan than a saving of walling and roofs. It is the only form that economises the warmth of a house, as the larger proportion of the wall surfaces are internal. In the irregular and picturesque style the outer walling is so much more cold surface added to the work the fires have to perform; and we may say the waste of heat in the fashionable villa residences is quite 30 per cent. more than in houses built in the row. The "picturesque-loving" architect—and who is there that does not admire the accidental grouping and succession of breaks and gables in an old manor-house of the later Tudor or the Stuart period?—increases his external walling by every projection and recession he makes; in fact, one of the articles of his creed is to pronounce his separate rooms, which cannot be done except by adding to their outer exposed surfaces. All these charms of piquancy and outline are unfortunately bought at the cost of fuel and comfort, and we may appeal to every candid and outspoken member of the profession in whom the man of science is not irretrievably lost in the enthusiast for style, whether a house of the square form is not more comfortable than the irregular and gabled villa or chateau? But the principle is self-evident that in a plan of square form the outside walls are minimised, and the internal warmth of a central stove-heated hall or the internal fire-places equably diffused throughout every part of the building. The advantage of well-built hollow walls, and the importance of damp-proof courses, we need not in a professional journal insist upon. In considering walls, however, the question of a facing occurs; and the profession generally have set their faces against cement as an external covering. We are not inclined to enter again into a controversy that has been waged so often—a correspondent the other day in our journal discussed the subject from a practical point of view—but we think that there has been a great amount of absurd prejudice entertained by architects of the muscular Gothic school against the use of Portland cement. The fact is, the material was so abused by a former generation—it covered up such vices of construction—that a well-founded contempt for stucco sprang up. But why should a valuable material suffer because of its ignorant employment? For Portland cement is a most valuable ally to the architect when employed rationally, and for the outer surfaces of rough brick or concrete walls it is often absolutely necessary. The great evil of its use, we have always contended, is its being made to represent such features as stone cornices, trusses, and other details for which stone or bricks can be only rightly used; but if used for the plain surfaces of walls it admits of many forms of appropriate decoration.

The next important feature in a weather-proof house is the roof. Here, again, the advantages of a plan in which the external boundaries partake of a square are obvious to every practical builder, but for like reasons to those at which we have hinted in regard to irregular houses, the fact is disregarded by the "artistic architect." A square trough-shaped roof is both unpleasing and easily choked up, and a lofty pyramidal roof is quite as ungainly and ugly. But both these evils can be obviated by making one or two slight breaks, by which a rectangular arrangement of two or more span roofs may be gained, always remembering that the simpler the roof is, and the fewer its component parts, and therefore gutters, valleys, and hips, the better. It is somewhat amusing to find this rule disobeyed, all conceivable jumbles of steep roofs, flats and gables being adopted to produce piquant bits of effect by the young architect, though it is by no means a laughing matter with tenants who have to do external repairs. The bad arrangement of roofs with respect to aspect is one of the commonest defects. It is not unfrequently that one sees a house with the valleys opening towards the most exposed quarter, or a series of open gutters in such a position that every wind would convert them into eddying troughs. Hopper-shaped roofs and enclosed gutters are arrangements always better avoided, and the principle should be to expose as little roof surface to the wind and wet as possible. The conformation of a roof we believe to be of immense importance to the comfort and security of a house, and no part thereof should be open to the attacks of heavy rainfalls or severe gales. For duchess or countess slates a lap of 3in. is not too much for ordinary pitches, and 2in. is much too small; each slate should be secured with two nails, and these ought always to be of copper, zinc, galvanised iron, or dipped in oil. Again, lead should be of at least from 6lb. to 7lb., the latter in the flat gutters and the former in the hips and valleys. Patent ridge and hip-rolls, made of slate, fastened with screws set in oil putty, are next to lead in effectiveness, and it should ever be remembered that cheap roofs are the dearest in the end.

There is also an immense amount of ignorance about chimney-building, or as to

what constitutes a good drawing and what a bad drawing chimney. We know it is perfectly useless to frame a code of rules on chimney-building, when the exigencies of house design have to be consulted, but when nothing interferes all chimneys should be placed on the sheltered sides, as internal stacks undoubtedly draw the best. Chimney stacks should always be built high enough to clear the effects of obstructing roofs, and a "blow down" is often experienced in flues that barely overtop an adjacent roof, and in those in a valley between two roofs. Of course, the inducing currents must be considered in reference to the prevailing winds, and not from the lee-sides. One common error is to make flues too capacious, and to build them with large throats, the consequence of which is the upward currents or gases are cooled down and the velocity retarded. The heated gases ascend in the centre of flue, which, if too large, cause down currents to be established, and the phenomena of smoky chimneys are greatly due to this cause. We might extend these remarks to the best position for fireplaces, upon which much might be said; but, as we have just remarked, the exigencies of plan are paramount, and the builder or architect has to consider rather the least objectionable of modes than the adoption of the best course.

SOME QUESTIONS OF "FIXTURES" AND OLD LIGHTS.

POINTS of law are constantly arising in the practice of the architect and surveyor, but as jurisprudence is not one of the subjects generally included in the usual professional course, nor very congenial to the young architect's taste, it is a study that is too often left to be picked up in the course of a professional career. Questions of fixtures and dilapidations occur every day; occasionally the law of boundaries and fences is forced upon the architect, while the question of "old lights" is a continually-recurring embarrassment to him. Not a few of such questions come before us every week in our column of "Intercommunication," and we occasionally have a knotty point placed before us. It is our intention now to dwell upon a few typical cases often occurring in practice. In reference to "fixtures" we confess it is no easy matter to determine some kinds of annexation, and this cannot be wondered at when the definition of the term itself has perplexed the most acute lawyers. There are certain cases which baffle the most experienced surveyor, and the profession are still far from unanimous as to what constitutes a fixture under certain circumstances. The most difficult cases arise when no express contract or agreement exists between the parties, and we think a great deal of trouble would be saved if the question of fixtures were always definitely determined before signing a lease. It must be remembered the ancient rule with respect to fixtures has been much relaxed. Formerly the law construed questions more in favour of the landlord than the tenant; thus, whatever was attached to the freehold became an integral part of it. Now there is a less vigorous enforcement of this rule, if we are to judge by recent decisions, and we believe future amendments in the law relating to landlords and tenants will tend still more to relax the rule. We may just mention here that the extension of trade soon exercised an influence in favour of a tenant's rights, and that trade fixtures such as bakers' ovens and dyers' vats, erected for profit, can be removed by a lessee. We may quote several cases, such as Chimie *v.* Wood, Lawton *v.* Salmon, to show that this rule is now established, and that goods affixed for trade purposes or profit to a freehold, although they become parcel of it, are subject to the rights of the tenant to remove them during his term—that is, of course, if he affixed or put them. We may enumerate among such removable fixtures pipes laid for convenience of trade, such as counters, coppers, and other brewer's vessels; marble chimney-pieces, when put up by tenant; buildings or sheds with brick foundations let into ground (Penton *v.* Robart). A large fixture or building, however, having the effect of injuring or destroying another important erection, though built for trade purposes, cannot be removed, and the court would in all probability inquire into the manner of annexation or fixing in all cases of building. It is worthy of mention that the right to remove trading fixtures does not extend to agricultural or horticultural buildings—such as cattle-houses and sheds and conservatories, though some conflicting cases have come before us. We may cite Lord Ellenborough's judgment in Elwes *v.* Maw as bearing upon this point—a decision which has been much questioned. But by the 14 and 15 Vict., c. 25, the Legislature has extended the right of removal to agricultural fixtures. By this provision a tenant of a farm, with the consent in writing of the landlord, can remove any building, engine, or machinery erected by him for the purposes of trade or agriculture, however fixed, if their removal does not injure the land or buildings of the landlord. A month's notice of the tenant's intention is required, whereby the landlord is empowered to purchase such fixtures at a valuation, the right of removal thereby ceasing. Hot-houses, forcing-pits, &c., may be removed by nurserymen, but greenhouses of wood, fixed with mortar to brick foundations, cannot be taken away by the occupier; boilers fixed are irremovable, but heating apparatus is not so. The importance of obtaining the landlord's consent before making erections is therefore clear.

As to the right to remove fixtures set up for domestic use or ornament, the law is not so clear, and each case must be considered on its own merits. The mode or purpose of annexation will have to determine the tenant's right. A very useful test of this right is the effect of removal of a certain article; another the prevailing usage. In regard to ornamental fixtures—such as chimney-glasses, hangings, wainscot, &c.—much difference has arisen. Lord Holt has denied the tenant's right (see Poole's case) to remove any kind of fixture, save those appertaining to trade; but Lord Wright (Squier *v.* Mayer) held that hangings nailed to walls were removable; so also in another case it was held that chimney-glasses, pier glasses, &c., were only matters of ornament and furniture, and therefore removable. (See Beck *v.* Rebow.) It is certain, however, that wainscot secured to the walls or joists in any way is accounted parcel of the house, and the same remark applies to marble chimney-pieces, except an *ornamental* chimney-piece put up by tenant during his tenancy (Leach *v.* Thomas). Another class of fixtures, those affixed for domestic use or convenience, are important. It has been ruled that articles slightly fixed, such as pumps, cisterns, &c., are removable, but things affixed to the house for the purpose of completing it, such as hearths, doors, verandahs, conservatories, become annexed to the freehold. We refer the reader to Chief Justice Dallas's important judgment in Buckland *v.* Butterfield bearing upon the last-named kind of fixtures.

Passing on to notice the question of "ancient lights," a very frequent case presented to us is where a person extends his building in such a manner as to obstruct the light of his neighbour. It is often required to extend the width of a house, and the question is whether, if the side wall has old lights in it, it can be extended without being liable to be interfered with. Lord Westbury's judgment in Tapling *v.* Jones appears to be the ruling principle here. He [illegible] "[illegible] by opening windows," that if A be the owner of a garden, and B the owner of an adjoining piece of land, B may build upon it a manufactory with a hundred windows overlooking A's pleasure-grounds, and A has neither more nor less right than he previously held of erecting a wall or barrier. The owner also of a house with a window enjoying an absolute and indefeasible right to certain access of light to it, can by this principle open other windows on either side without making his right thereby defeasible, for by opening the new window he does no injury or wrong to his neighbour, who is at liberty to build up against them so far as he possesses the right of building on his land; but it must be remembered he possesses *no right* to *obstruct* the *ancient window*, and to that extent his right of building is gone. If this decision be kept in view, we believe many doubtful and perplexing questions would be solved that are constantly occurring.

PARIS EXHIBITION MEDALS.

OUR attention has been called to several omissions in our notices of the medals and prizes gained by English exhibitors at the Paris Exhibition. We set ourselves the task of indicating only a few of the more prominent awards, and did not undertake to furnish a complete list. We should have stated last week that silver medals in Class 25 were gained by Messrs. J. W. Singer and Son, Messrs. Hart, Son, and Peard, Messrs. J. Hardman and Co., and Messrs. Barnard, Bishop, and Barnards. In Class 43 Messrs. H. H. Vivian and Co. take a silver medal. Among the awards in Class 66 it seems that a silver medal gained by Messrs. Jones and Willis, of Temple-row, Birmingham, for their wrought-iron gates, has been omitted in the official list. Messrs. Jones and Willis also obtained a bronze medal in Class 24, and another bronze medal in Class 18. The wrought-iron gates for which the silver medal was awarded were remarkably distinguished for their beauty and correct design. The official list is sadly inaccurate, and bears signs of very hasty compilation. Thus the awards, as given class by class, differ materially from those to be found in the alphabetical list in the early part of the volume, and exhibitors must be in some doubt which record to adopt. The case of Messrs. Jones and Willis is only one among more than a score to be found in the first few pages. Even the title-page is rendered conspicuous by a most absurd blunder, for we read in a work sent out by the Queen's printer that it is published by the direction of "His Royal Bighness the Prince of Males!"

ARCHITECTURAL ASSOCIATION.

THE first ordinary meeting of the Association was held on Friday evening in the Institute rooms, the President, Mr. H. L. Florence, in the chair. A long list, comprising 63 names, was read of nominations for membership. On the motion of Mr. HAYES, senior hon. secretary, thanks were accorded to all who assisted in making the conversazione a success, not without a hint being expressed by Mr. RIDDETT that in future the cloak-room arrangements would be better. Mr. ISAACS explained that the discomfort experienced was due to the insufficient capacity of the Institute premises, and that Mr. C. J. Phipps had informed him that enough had been subscribed to warrant him to commence the preparation of plans, and to put the work in hand—an announcement received with applause. Mr. J. DOUGLASS MATHEWS, the treasurer, read the balance-sheet, which was satisfactory in character, and said that the sum of £50 had been invested in National Discount Company's stock as a reserve fund—a reserve which Mr. CLARKSON explained it was not intended to increase.

Mr. R. C. Page, hon. sec., read the reports of the various classes, 11 in all, which were formally received. It appeared that the elementary class of design had more than doubled in number, and the work executed was correspondingly greater than in previous years; this development seemed, however, to have been made at the expense of the advanced class, which is to be remodelled this session. The most successful class was that of construction and practice, which exhibited a steady increase for the past three years in numbers and average attendance, and papers contributed. Some of the classes showed a falling off. The library had been more used, both by readers and borrowers, than in previous years; it now contains 600 works in 900 vols. The consideration and adoption of these reports was adjourned till after the delivery of the

PRESIDENT'S INAUGURAL ADDRESS.

In his opening remarks the President sketched the entry into the association of a young student, and his joining with diffidence and hesitation the class of design, where he learned to compare his own work with that of others, to be criticised and to criticise. Having traced the career in the association of the member till his election on the committee, and becoming the founder of a new class, Mr. Florence pictured him as having completed his articles, and after pursuing his studies for awhile in a Parisian atelier, returning to compete for the prizes at the Institute and Academy, and supposing him successful, as obtaining the Tite prize, Soane medallion, Travelling, and Gold Medal studentships of the Academy. Another year passes in travel, and on his return the member resumes his place on the committee of the association, serves a year as vice-president, and at length, added Mr. Florence, the student who had stood alone and friendless at the door, now thanks you for the honour you have conferred on him in selecting him for the office of president. Seeing that he owed entirely to the association whatever success he might have met with, he would urge on each member the duty and advantage of supporting it by every means in his power. And when they remembered that last session 106 new students joined, and the long list read that evening, the elder members would pardon him should he specially address those just beginning work, even at the risk of appearing elementary and discursive. Those interested in the association must regret that out of so large a number of subscribers as those now upon its books, so small a proportion should avail themselves of its advantages; and this at a time when special education forced itself more strongly than heretofore upon architects. He wished to show the practical mode of putting good intentions to the test, and at the same time to incidentally examine into certain causes which had weakened the amount and quality of the work done last session. This he would do under three heads—addressing each member individually as a student in the classes, as an attendant at the meetings, and eventually as an architect. Allusion was made to the changes about to be introduced into the Class of Design, it being insisted upon that this class ought not to suffer from the establishment of an architectural school at the Royal Academy, for the number of students on the Academy books was 40, of whom only about half were members of the association, and most of these had already passed through the design class. Both in the classes and in the general meetings more extended preparation of papers and greater freedom of discussion were needed, and he urged members to take part in the proceedings. A facility and clearness in speaking on technical matters was of advantage to the architect, who was frequently called upon to address a committee or board meeting, where he ought to meet queries and objections with ease and readiness, and to endeavour to remove prejudices and enlighten ignorance. But it was to the artistic training of the artist that the speaker attached the greatest importance. Indeed, the architect before all and in all ought to be an artist. In this lay the pleasure which he should feel in his work, and without which it would be dull and lifeless. In this ever-striving towards an ideal excellence, in this ceaseless struggle with material obstacles, there was no room for apathy, indifference, or sloth; and there was a common bond and tie between architects. In no other motive could they find the pleasure in their work which preserved it from the formality of custom, and by no other claim would its reputation survive the worker. Further than this, it was the quality of art which alone defined the architect. He might be skilled in science and construction, able in business, even possessed of taste and judgment, but it was the presence of art in his work which gave it an indefinable charm by which it could be recognised as that of an architect. This quality of work would only come by study, and hence the necessity for raising the standard of the work done by the association. In thus bringing the quality of art before the members as a practical means to a definite end he did not intend to encourage the "art cant" of the day. It was easy to talk art, to preach the gospel of red brick, blue china, new furniture, and old embroidery—an art which luxuriated in cut festoons and turned posts on the ground floor, and reached its climax in a tile-hung upper story. These were signs of taste, of fancy, or of fashion, but was of no period, and in truth did not consist in outward adornment, but rather in the living presence of the designer's thought. An architect's education could not be entirely carried on in the association rooms. He had sufficient opportunities in the office in which he was articled to attain a certain proficiency in draughtsmanship and a general knowledge of at least the rudiments of construction and archæology. As to the power to originate ideas and other advantages to be derived from a careful study of the antique, Mr. Longfellow, the editor of the *American Architect*, had written to him that "The men who have been most successful in originating have been those most studious of precedent and most rigorously trained, because thus they have gained the sureness of hand which has saved them both from timidity and from disaster when they were at their own guidance. This is true in a greater degree of nations. The architects who in this century have shown the most original power are unquestionably the most systematic, the most academical in training—the French. It is because they have acquired their power by the best means f discipl.. the world now affords architects, the discipline of the most formal, being based entirely on study of the antique. It is particularly noticeable that they have been bolder, more characteristic and straightforward, less conventional, and more successful artistically than any others in the handling of the untried material—iron. The unconventional American has thus far found nothing better to do with his iron than to work it into clumsy and shamefaced imitations of stone and wood. The Frenchman, slave of his schools and his precedents, develops it into forms unseen before, and clearly expressive of its exceptional qualities. In like manner it is not the engineer or the mechanic, when he undertakes to add decoration to his work, untrammelled as he is by artistic prejudice, who shows most originality or straightforwardness in ornamental treatment, to say nothing of other excellencies. It is the well-trained designer; and this because he only has acquired by discipline the artistic sense of fitness which can show him the incongruity of old forms in new materials, and teach him to modify or replace them for new condidions. . . . Originality is one of the qualities which always disappoint a direct pursuit. From a disciplined hand it comes without direct effort if it comes at all; from the undisciplined it is too likely to mean only the fantastic." To the architect it was a prime necessity that he should be able to draw freely and well, and the speaker knew no easier means of acquiring this power than the frequent practice of sketching, measuring, and drawing out existing buildings. This taught at once proportion, exactitude, and manual dexterity. The use of the brush conjointly with that of the pencil would do much to counteract any disposition to mannerism, in addition to its value as an artistic form of expression. Another excellent aid was the preparation of drawings in competition for prizes offered by the association or other societies, and in this connection he might refer to the founding of an Architectural Association Medal, to be awarded every year in conjunction with a prize, value 5 guineas, in books, to the author of the best design for a given subject chosen by the committee. He would offer an additional prize, to be awarded to the design placed second in order of merit. An architect, besides being proficient in draughtsmanship and studies more directly bearing on his profession, ought to devote some attention to general literature, that he might be well informed in the various branches of science, art, history, and topics of the day, and should acquire at least one language besides his own, preferably French. He could not better illustrate the advantages of general culture than by reference to the life of one whom he, as a friend and pupil, deeply deplored—the late Frederic Pepys Cockerell, who consistently carried out his father's precept—"To be an artist among gentlemen and a gentleman amongst artists."

Mr. R. Phene Spiers was glad the President had given them his own experiences and such encouraging advice, for it opened to each member at least the chance that he might carry in his knapsack a *bâton d'un maréchal*; still unless life were greatly prolonged the whole of the members could not sucessively occupy that chair, but there were other modes of usefulness open to them, and he trusted the remarks would be taken to heart. He regretted much to hear that the class of design was to be given up for a time; he would urge on the members the desirability of striving to carry off the medals, prizes, and studentships offered by the Academy, Institute, and Association, rather than entering upon public competitions. The former were more likely to be judged fairly, and success in these gave a position and renown of higher character than could be obtained by the more general competitions.

Mr. Riddett criticised the several reports, and suggested that the association should continue to lay aside a reserve so as to enable them to obtain rooms for themselves or a more satisfactory footing in the present premises. He thought one reason for the failure of the class of design and for the general lethargic condition of the designing mind might be the very large number of illustrations published in the architectural journals week by week.

Mr. J. D. Mathews expressed his deep regret at hearing of the sudden death of their friend, Mr. F. P. Cockerell, and suggested that a letter of condolence should be forwarded on behalf of the members of the association to Mrs. Cockerell.

Mr. R. P. Spiers seconded the motion, remarking that he did not know any artist, either in England or France, who was capable of producing more finely-executed drawings than their late friend.

The motion was unanimously agreed to.

Mr. J. D. Mathews having appealed for additional subscriptions to the Sharpe Memorial Sketches, for which he said the plates were ready for photo-lithography, and were only delayed till it should be known how many copies might be struck off, a vote of thanks was awarded to the President for his address, on the motion of Messrs. Spiers and Riddett, and was suitably acknowledged.

THE DISPOSAL OF SEWAGE.

THE session of the Philosophical Society of Glasgow was opened on Thursday, the 7th inst., by an address from Dr. Fergus, the president, on sewerage schemes. Having glanced at the ancient modes of sewage removal he came to consider the adoption of the water-closet system. That change, he was convinced, was made without the slightest investigation as to the results that would flow from its adoption, and the issue had been the pollution of rivers. Many supposed that the pollution of rivers arose from chemical works, but he had found the chief contaminating ingredients were derived from excrementitious matters. For instance, the Thames and the Clyde were only polluted below where the sewers were led into them, while the Tyne, though having on its banks a continuous line of chemical works where 45 per cent. of all the alkali in the country was manufactured, was so pure that salmon freely passed to the upper reaches. One of the greatest mistakes that had been made was to look upon water as a purifier, whereas in

reality it was simply a carrier. Then as to subsoil drainage, if it had been restricted to rainfall alone it would have been an enormous advantage to public health, but in addition to rain water all kinds of abominations had been thrown into the drains. When the old square drains were done away with and the egg-shaped ones introduced, it was supposed that they would sweep away all refuse matter. But they still held excremental deposits, and these decomposed and were added to, and when water got into the pipes the gas from the decomposing matter escaped. Indeed, the cesspools, traps, and sewers were ingeniously contrived laboratories for the production of gas that could not but be injurious. It was attempted to apply the sewage to land, but he denied that it could be taken to the outfall fresh, for it decomposed before it had left our houses. Proceeding to the considerations of excremental pollution poisons, in which the president included diarrhœal, diphtherial, and typhoidal diseases, it was urged that these were spread in our towns by the drains and sewers. He condemned Mr. Bateman's plans, submitted to the town council for removing the sewage of Glasgow to a point lower down the river, as imperfect. The authorities seemed to have forgotten that Glasgow had experimented with a substance now proposed as a precipitant —viz., lime—and the result was a signal failure. They had to bear in mind that the polluted matter was not in suspension but in solution. It might be that some one would discover a material that would precipitate and fix these soluble matters, but at present it had not been brought forward. The only remedy for the present difficulties in sewage disposal was a return to nature. Excrementitious matters must be applied to earth. There was no risk till decomposition set in, and he believed that if a hundredth part of the skill and ability and ingenuity that had been devoted to water-carriage were applied to the subject, free from the preconceived false idea of water being a universal purifier, the problem would be solved.

BUILDERS' BENEVOLENT INSTITUTION.

THE thirty-first anniversary festival, in aid of the funds of the Builders' Benevolent Institution, was held on Thursday, the 7th inst., at the Freemasons' Tavern, Mr. Edward Conder, President, in the chair, supported by about 220 of the friends and subscribers to the charity.

The CHAIRMAN, in proposing the toast of the evening, "Prosperity to the Builders' Benevolent Institution, said:—Thirty-one years ago this institution was founded by the late Mr. Cozens, and from that time to the present it has done an immense amount of good in alleviating distress, and in helping many a poor person who had seen better days. Some of those who have been our pensioners had once been in affluent circumstances. I find that there are on the list of pensioners at the present time 24 men receiving £30 a year, and 23 women receiving £24 a year, and in a few days an election will take place for two more men and two more women. Thirty pounds a year is really a very small sum for a person who has seen better days to live upon, and I would that it could be increased, but there are so many applicants for the benefits of this institution that we really cannot increase it. It has, indeed, only lately been increased from £24 to £30. There is no doubt that the trade of the builder has more vicissitudes than almost any other in the metropolis. It is liable to losses from various causes, sometimes through no fault of the builder. As a case in point, I recollect that some years ago the fact of a brick falling down from one of my scaffolds cost me £800. In its descent it struck against something and rebounded, and in falling it seriously hurt some one. An action was entered against me for £1,500, and I was very glad to settle the matter for £800. Now such a calamity as that would cripple many men, particularly if they were only just commencing business. Those who are able to escape such calamities should be thankful that they are able to help those who are in misfortune. Again, many master builders, through being overtaken by ill-health, are not able to look after their work as they ought to do, and we all know that unless we look sharply after our work it is impossible to make it pay. Others, again, are unfortunate in their contracts, either through strikes or from some combination of unfavourable circumstances. Some, again, seem never to do well, and almost seem destined to be unfortunate. However, for all, we do the best we can in this institution. I must say I am very sorry to observe that the increase in the funds of this society has not been commensurate with the increase of the population of London, and with the increase of the London building trade. I find, on turning to the "Directory" for 1852, that there were then 746 builders in London, and I also find that the subscriptions and donations to this institution for that year amounted to £1,223. On turning to the "Directory" for 1878 I find the names of 1,355 builders in London, nearly double the number of those in 1852; but I am sorry to say that the subscriptions and donations for last year only amounted to £1,440, or about £200 more than they were in 1852. Now this is a state of things not creditable to a great trade like ours, for undoubtedly we are the largest trade in London, and I do urge upon you, and upon every member of this association, to endeavour, before our next annual meeting, to obtain new subscribers to the institution. I am quite aware that many of the larger builders, and of those connected with the building trade as merchants and manufacturers, have given liberally, and we have to thank them very much for their liberality in past times, as, I have no doubt, we shall have to thank them in the future. But when I look at the "Directory," and find that out of the 1,355 builders there specified, only about one-third of their names appear in our subscription list, I say that there is an ample field for all zealous friends of the institution to endeavour to obtain new subscribers to its funds. It is not always, perhaps, a very pleasant thing to be begging for subscriptions, but when we are trying to do good to our poorer brethren it is our duty to put our own personal feelings aside. Many a non-subscribing member might, by a little well-directed persuasion, be induced to give a guinea to the funds of the institution, and he will never miss it in the year's income. I am sure that if all the builders of London could see, as I have seen since I became its president, the working of this society, we should have a much larger subscription list. The committee, and our very good treasurer, Mr. Plucknett, work hard in looking after the interests of the charity, and in seeing that the persons who apply to become pensioners are the right sort of people—that they really have been builders. I can, therefore, with confidence, ask you to do your utmost to aid the institution. As builders it is our bounden duty to assist those of our trade who are in distress, and who have lost their all by misfortune—from causes beyond their control. If additional help be accorded to the institution the committee will be only too glad to extend the area of its operations. I, therefore, ask you to drink "Prosperity to the Builders' Benevolent Institution."

RECENTLY-EXECUTED DOCKS AND HARBOURS.

AT the meeting of the Institution of Civil Engineers, on Tuesday last, Mr. W. H. Barlow, F.R.S., Vice-President, in the chair, the first paper read was on "The Avonmouth Dock," by Mr. J. B. Mackenzie, M. Inst. C.E.

In 1864 Mr. Brunlees, V.P. Inst. C.E., recommended a scheme for a dock at the mouth of the Avon, which had been previously suggested. It was undertaken by the Bristol Port and Channel Dock Company in 1868, and was completed in 1877. The dock was on the Gloucestershire side of the Avon; from the anchorage of King-road in the Bristol Channel to the entrance lock the distance was only 1,000 yards. The entrance channel from the Avon to the lock was about 350 yards in length by an average width of 70 yards, with a depth at high water of equinoctial spring tides of 44ft., and of 40ft. at ordinary spring tides. The dock was 1,400ft. in length and 500ft. in width, giving a water area of about 16 acres, and a length of quay wall of 3,200ft. The south end was not protected by a wall, but was finished off with a slope of 2½ to 1. The range of an ordinary spring tide was 39ft., while that of an ordinary tides neap tide was 19ft. A special feature of the was the quantity of mud which the water held in suspension. The complete silting-up of the old entrance of the Avon a few years ago, and the opening of the present Swash Way, was a striking example of mud settlement and accumulation. A temporary embankment, to exclude the tide during the construction of the works, was made by tipping silt excavated from the dock over the ground. A wooden truss was used to exclude the tide while the outer clay dam was being removed. It proved satisfactory; and the leakage from the tide was easily kept under by a small force pump. The mouth of the lock had a wing wall on each side, extending about 159ft. beyond the roundheads, and diverging from a line parallel with, and 100ft. distant from, the centre line of the lock, at an angle of 11° 30′. Rubble masonry faced with rough ashlar was employed. The walls were 49ft. in height from the top of the footings to the coping, 23ft. 6in. wide at the base, and 7ft. wide at the top. The face was battered to a radius of 150ft., and the back had two steps 18in. and two 12in. wide. The footings were also of rubble masonry, and rested on sand; the inverts were of brick. The clear length between the inner and the outer gates was 454ft. This length was divided by a pair of gates into two locks, the inner one being about 50ft. longer than the outer one. The foundations of the lock were laid upon a bed of fine grey sand, underlying clay at an almost uniform level, and at a depth of about 6ft. under low water of equinoctial spring tides. The frequent occurrence of springs in this sand was a source of some trouble and difficulty. The apron in front of the lock was a mass of lime concrete, mixed with blocks of stone of 2 to 3 tons weight, and surrounded by walls of Portland cement concrete. The lock gates consisted of oak heel and mitre posts, except the outer pair of gates, which were of greenheart, with ribs, intermediate posts, and walings of pitch pine and Memel. The gates were 2ft. 8in. thick at the heel and mitre posts, and about 2ft. 11in. thick at the centre of the leaf, exclusive of the walings. The back of the gates, when shut, formed a continuous arc of a circle from one hollow quoin to another, the radius of which was 50ft. The ribs and intermediate posts of the upper gates were differently arranged to those of the middle and outer gates. The height of the dock wall was 40ft., and the depth of the foundations below the dock floor varied from 2ft. 6in. to 19ft. The footings were of lime concrete, 22ft. 6in. in width, and were carried up 2ft. above the dock floor. From this level to the top the wall was buit of rubble masonry, faced with dressed stone. Two failures of parts of the dock wall, caused by the wall slipping forward and sinking, were then described, and the remedial measures pursued, also the modifications introduced in the subsequent work. The earthwork chiefly consisted of clay. Upwards of 1,750,000 cubic yards of material were shifted from the dock basin, lock, entrance channel, and foundations. Of this quantity about 150,000 cubic yards were dredged from the entrance and discharged from hopper barges at a shallow part of the Bristol Channel, about 3 miles from the works. The average cost of the excavations, including a portion of the pumping expenses, was about 1s. 6d. per cubic yard. The average price for rubble masonry was about 20s. per cubic yard. The Portland cement concrete consisted of 1 part of Portland cement, 3 parts of sand and gravel, and 5 of stone broken to a small size, and the whole mixed with large blocks of stone. The average price of this concrete was about 16s. per cubic yard. The lime concrete used for the foundations was mixed in the proportions of 6 to 1—viz., 1 part of lime, 2 parts of sand, 2 of ashes, 2 of broken stone, and cost about 10s. per cubic yard.

The second paper read was on "The River Lagan and Harbour of Belfast," by Mr. T. R. Salmond, M. Inst. C.E. About two and a half centuries back the harbour of Belfast was but an insignificant creek of the Lagan, and was under no regular form of government. In 1785 the tide flowed up the river a short distance above the town, but ebbed almost entirely out, leaving a narrow serpentine channel of fresh

water, which flowed through extensive flat sands. The quayage amounted to about 1,780 lineal feet, one-half of which could only be counted upon as suitable for vessels of large burthen. In 1837 an Act was obtained, embracing the following works, which were ordered to be carried out:—1st. The construction of a new navigable channel through the slob-ground, from the Dunbar Dock entrance to a point in the old channel course nearly opposite Thompson's Tower, thereby cutting away the first bend of the old channel next the town. 2nd. The purchase of all the existing docks and quays, which were owned by private individuals, and the widening and improving of the same. 3rd. The formation of a second straight cutting or a channel through "the Flats," in continuation of the first cut to the buoy of the Flats, where deep water would be secured. The first section of the new channel, from the Dunbar Dock to Thompson's Tower, was completed and opened for traffic in the year 1841; the cutting was about 3,000ft. long, 370ft. broad, and 12ft. deep at low water. The soil excavated from this work was used in the formation of the side embankments, and in making up the Queen's Island, a large portion of which had been utilised for ship-building purposes. Between the years 1846 and 1849, the second cut of the new channel was executed. This cutting through "the Flats," between the Twin Islands formed by the excavated material from the bed of the cut, was about 3,300ft. long, the width at the top being about 450ft., and the depth about 23ft. at high water. A commencement was made in the year 1858 towards the regular deepening of the navigable channel. So great was the improvement effected by dredging between the years 1858 and 1861, that vessels of 22½ft. draught were enabled to reach the quays at spring tides without lightening their burthen. Dredging operations had been carried on from that date to the present time. The present course of the navigable channel at Belfast was straight for a distance of 2 miles northwards from the Clarendon Dock entrance, and it had an average depth below water of about 12ft. From the north end of the Twin Islands it was serpentine for about one mile towards the pool of Garmoyle, which had a depth of 20ft. at low water. From this place it followed for another mile a straight course through Whitehouse roads, and curved again towards the north-east, across a bar about 4,000ft. in length, with 11ft. depth of water over it opposite the Oyster Bank, into the open lough. The author gave a description of the shipping accommodation at present available at the port. Rather more than one-half of the quayage was of stonework, and the remainder of timber. On the county Down side of the harbour the subsoil was chiefly sand and stiff red clay; on the county Antrim side it was principally soft blue clay, for a depth of upwards of 66ft., before a firm stratum of sand or clay was reached. Between the years 1844 and 1847, when the construction of new quays was undertaken on both sides of the river northwards of the Queen's Bridge, from the designs of Messrs. Walker and Burges, a timber wharf facing was adopted, being tied back by iron rods and stay piles. The cost was comparatively small, being only about £12 12s. per lineal foot of wharf, which included "filling," to the extent of about 170 cubic yards to each lineal foot. In the year 1864 the dock accommodation was extended to provide a greater depth of water, and the new works were executed in stone. The depth of water for which provision was made was, on the county Down side, at Abercorn Basin, 10ft. at average low water; and, on the county Antrim side, 15ft. at low tide. The paper then described the construction of the walls and of the foundations of the Abercorn Basin, and of the Dufferin and Spencer Docks; also the settlement of the walls of the docks, consequent, in the author's opinion, on the weakness of the piling timber, the insufficient depth of footings, and the unsuitable material for filling in behind the walls. The general character of the most recent practice was exemplified by the Queen's Quay, which was constructed in 1877. The average rise of the tides at Belfast Harbour above Ordnance datum was 8ft. 10in. at spring tides, and 7ft. 4in. at neap tides. The highest spring tide on record was 17ft. 2in. above Ordnance datum. The revenue of the port in 1786 was £1,558; that of 1876 was £99,533 6s. The tonnage in 1786 was 38,421, and in 1876 it reached 1,497,585 tons.

The third paper read was on "The Whitehaven Harbour and Dock Works," by Mr. J. E. Williams, M. Inst. C.E. Whitehaven being situated on a bold and exposed coast, it was not surprising that many schemes had been brought forward for the improvement of the harbour. In 1768 Smeaton proposed its enlargement by the construction of a north pier and other works. Many other schemes followed, but it was not until 1823, when Messrs. Whidbey and Rennie suggested the construction of the west pier, that practical steps were taken to further enlarge and improve the harbour. The work was commenced in 1824; as the pier advanced seaward it became evident that the harbour was rapidly silting up. This was no doubt caused by the structure intercepting the shore currents, carrying with them sand and other matter in suspension. To counteract this deposition within the harbour Mr. Rennie urged upon the trustees the importance of constructing the north pier, by which the current setting to the southward would be diverted. This suggestion was not adopted, and a few years later when the west pier was well advanced, the shipmasters of the port memorialised the harbour trustees to prevent the further extension of the structure, as the difficulty of entering the harbour had already been greatly increased. In 1833, after Sir John Rennie had again advocated the importance of proceeding with the erection of the north pier, the work was commenced. In January, 1836, during a severe westerly gale, one vessel out of a large fleet, in entering the harbour, fouled the crane engaged in completing a jetty at the end of the north pier. In consequence of this mishap, and of other accidents to the shipping, a public meeting was held, and a copy of the resolution passed was forwarded to Sir John Rennie, who, in reply reminded the trustees that the pier-head of the west pier had not yet been constructed as he had recommended. Subsequently the spur at the end of the north pier was removed, and the west pier was completed by building a bold pier-head. The total cost of the works was about £160,000. On the completion of the west and north piers the harbour of Whitehaven became one of the most commodious and convenient in the Channel, and many schemes were brought forward for obtaining wet-dock accommodation at the port. But it was not until 1871, when the trustees of the town and harbour obtained the "Whitehaven Dock and Railways Act," that practical steps were taken in the matter. The works were designed and carried out by Mr. Brunlees, V.P. Inst. C.E., the Author being the resident engineer. In addition to the wet docks and railways, the works included the construction of new piers within the harbour, and the carrying out of other important improvements in connection with the port. The site of the dock was that originally proposed by Mr. Stiven, the surveyor to the trustees, and consisted of a portion of the north harbour and shipbuilding yard. This area was chiefly covered with sand, in some places of a treacherous and silty nature. Considerable difficulty was experienced in executing the work, owing to the north harbour having to be kept open for shipping. Progress was therefore tidal and intermittent in character. The dock was opened for traffic on the 22nd of November, 1876, the tidal water having been excluded from the area of the dock works in the previous April. The wet dock had a water area of 4¼ acres, and was surrounded by quay walls 40ft. in height. The entrance was 50ft. wide, and the depth of water was 21ft. over the sill at spring-tides. The old north wall was demolished, and a new pier, 50ft. wide, was constructed, the north harbour admitting a much larger class of vessel. The seaward face of the new pier was built of ashlar, set block in course, and surmounted with a parapet wall. The walls against which the vessels lay were built of rubble and concrete, the face being hammer-dressed, and laid in broken courses or snecked, with a batter of 1 in 12. A portion of the foundation of the west quay walls was piled, and during construction a short length of the outer wall slightly settled immediately over the old channel of a land stream. This was arched over, and the wall carried up and surmounted by coping. In order to connect the north and south sides of the harbour for traffic, an embankment was formed across the beach in the inner harbour, the seaward face of which was protected with stone pitching laid to a slope of 1½ to 1. Upon this embankment the permanent way was placed, connecting the north and south sides of the harbour. Sidings were also laid round the several quays in connection with the London and North-Western and the Furness Railways. The crossing of the patent slip at the south end of the embankment was effected by a swing bridge; the weight of the bridge was 70 tons, and it could be opened or closed by one man at the turning gear. The old timber slip was demolished, and a new one constructed further seaward; the extension of the waterway of Pow-Beck, and the construction of a new quay across the end of the Custom-house Dock, were also effected at the same time. The total cost of the construction of the wet dock, the north harbour extension, railways, and all other improvements was about £100,000.

AN AYRSHIRE LAKE DWELLING.

INTEREST in lake dwellings has, according to the *Scotsman*, been reawakened by the discovery of a crannoge on the farm of Lochlee, near Tarbolton, in Ayrshire, and there is every prospect, from the care which is being taken by the Archæological Society for the counties of Ayr and Wigton to have it thoroughly investigated, that it will supply much valuable material to Scottish antiquaries. Forty years ago this crannoge was covered by the waters of a loch, which extended over a considerable portion of the present farm. It was exposed, however, shortly after by the complete draining of the loch, when it attracted the attention of the curious in the neighbourhood from its artificial appearance, and still more by the discovery of two canoes in the bed of the lake. Its real nature, however, does not seem to have been suspected—a thing not to be wondered at, seeing that neither Swiss "Pfahlbanten" nor Irish crannoges had as yet been described. Having thus narrowly escaped fame forty years ago, the ancient bed of Lochlee has since known no further change save that produced by the inevitable rotation of crops. Re-draining operations, however, were commenced a few weeks ago, and these have led to the opening up of the mound, and the discovery of the characteristic features of the crannoge. From the excavations which have been already carried out, the structure would appear to be circular in form, and about 25 yards in diameter. It is surrounded by a stockade of young oak trees, which in some instances are fixed directly into the mud of the lake bottom, and in others fit into holes in horizontal beams. The interior of this artificial island appears to be formed of woodwork, interspersed with large stones and masses of clay. Near its surface there are the decayed remains of a rude platform formed "of rough planks and sapplings lying on beams of split oak trees." In cutting a trench through the mound two stony pavements were come upon near the centre, each resting on a bed of clay, which from the surrounding remains of ashes, charcoal, and burnt bones, had evidently been fire-places, and still lower the clay of a third hearth was discovered. The existence of these fire-places, one above the other, would seem to indicate that, during its occupation, the water had been gradually gaining upon the crannoge, and so necessitated the raising from time to time of its surface. Similar indications have been met with in several of the Irish crannoges. Unlike most of these, however, it seems to have been connected with the shore by a gangway, three rows of closely set piles having been found to extend from the mound to the mainland. Among the remains which have already been dug up are a canoe, hollowed out of a single tree, querns, bone chisels, hammer stones, a spindle wheel, deer horns with marks of cutting upon them, boars' tusks, and a great variety of the bones and teeth of animals. With the exception of a three-pronged iron instrument found in the drain outside the mound, and another piece of iron found near

the surface, there is no trace of metal; while a piece of red pottery, also found outside the mound, and the half of a grooved bead, are the only specimens of ceramic art. It is too soon yet to form conclusions as to the age, &c., of this interesting relic of bygone times, but archæologists will look forward with interest to the publication in the proceedings of the society already mentioned of a full account, with plan and sections of the Lochlee crannoge.

FIVE ELIZABETHAN JOHNS.

THE Johns, respectively of Padua, Kaye, Shute, Thynne, Thorpe, constitute, no doubt, as suggested at page 474, a subject of inquiry possessing great architectural interest, and therefore well deserving to be discussed. But the central figure of that quintette has been thrown into prominence by the illustrations in the current number (Nov. 8) that so completely sustain the title of "paynter and archytecte." These illustrations represent the Tuscan and Doric orders. In the first the base, shaft, and capital are not more than 5½ diameters in height, and the plinth of the base follows the circular plan of the surmounting torus—an invention perhaps of Shute. The pedestal is only 2 diameters high, one being divided between the cap and base, so that the die is a precise square in plan and elevation. The Doric example gives nearly 7 diameters to the height of the column, and the die of the pedestal is equal in elevation to the diagonal of its plan. The shaft is fluted, the capital enriched, and the entablature charged with every recognised adornment. The one displays rude nerve and strength—the other has the polish of a higher standard. A duplicate profile of each order is given, and an atlantes substituted for the column. These robust figures are only about six-and-a-half heads high. One is Hercules, nude, but for the ample hide of the Nemæan lion, and he holds a pondercus club. The other is a Roman imperator, sumptuously attired in tunic and cuirass. The paludamentum depends from a knot on the left shoulder. Boots of elaborate pattern protect his feet, and reaching half way to the knees, finish with the preserved heads of the animals whose dyed skins form the general material. The club is here replaced by a carved sceptre, and the head is adorned with a crown of middle-age device. In these two figures the hero of primitive times is contrasted with one of an advanced civilisation. Yet, by a singular anachronism, the latter is coupled with the Tuscan, and Hercules with the ornate Doric. Perhaps the owner of the volume will descant on this, and certainly the general art-feeling of the examples would lend interest to the elucidation.

Shute, it may be said, is the only one of the five Johns whose identity is undisturbed, and he seems to have expired just as the evidences of his architectural capacity came to light. Of his contemporaries more anon.

THOMAS MORRIS.

ALFRED THE GREAT'S PALACE.

MR. HUNT, the hon. secretary of the Somersetshire Archæological Society, sends a report of an interesting discovery at Wedmore. Before the Conquest Wedmore was the site of one of the palaces of the Anglo-Saxon kings. It was there that the great peace was made with the Danes in 878, and the chrisom-loosing of Guthrun was kept. Wedmore remained the property of the Crown until it was given to the See of Bath and Wells by Edward the Confessor, and at the same time Mudgeley, a hamlet of Wedmore, was granted to the bishop by Eadgytt, the Queen of Edward. Tradition has pointed out a certain field in Mudgeley, about a mile from Wedmore Church, as the site of the old palace. This is called the court garden, and there are may stories of the treasure which is said to be hidden there. Mr. Sydenham Hervey, the rector, son of the Bishop of Bath and Wells, has lately made some excavations in this field. Extensive remains of a building have been found—not mere foundations, as the walls are in some places plastered on the inside. The walls are massive, the mortar of an ancient character, and the whole appearance of the building speaks its great age. A large quantity of pottery has been found, some Roman and some of an early English character—one piece, a small and perfect female face, probably the mouth of a jar; handles of some vessels of the shape of amphoræ, several bits ornamented with a rude band of leaves, &c. As yet no coins have been found. Some of the walls are buried at a depth beneath the surface of the land of 6ft. to 10ft.; others, which are on rock, are but thinly covered with earth. Five lines of wall have been opened, and Mr. Hervey is now endeavouring to find the connexion between the different parts of the building. There can be little doubt but that he has discovered the remains of the old palace of our West Saxon kings, the very scene of the high festival at which, 1,000 years ago, the peace was signed with the Danes, and the fillet was loosed from the brow of Guthrun, or rather Æthelstan, to call him by his new Christian name. The character of the pottery and the shape of some of the shingles which have been found seem to point to the probability that the old English building was raised upon the site of some older Romano-Celtic villa. It is hoped that funds will be forthcoming to enable Mr. Hervey to carry out his explorations thoroughly, as it is thought almost certain that much remains to be laid open, and the discovery of coins, which are no doubt to be found, will make the whole matter more interesting and satisfactory.

BOOKS RECEIVED.

China Painting, by M. Louise McLaughlin, (Cincinnati: Robert Clarke and Co). This is a small manual intended for the use of amateurs in the decoration of hard porcelain, and from a general glance at its pages, we think it will be found an admirable guide to many of the mysteries of china painting. We believe the art offers to the amateur, and lady artist more especially, a very pleasant pastime, though, as the author observes, there is a danger of its degenerating into a kind of amusement unworthy of serious study. In fact, we regard tasteful china painting quite as rational an art as oil or water colour sketching; it is even more durable when we come to consider its pigments are fixed by the fire and covered by enamel. We quite agree with the author that the servile copying of old designs cannot lead to a revival of the art. The chapter on materials gives some good advice as to selecting china of the finest quality, and free from spots. French porcelain is recommended, the colours must be vitrifiable, having, in addition to the colouring matter, a vitreous flux, and ordinary water-colour brushes may be used. In preparing the design the china should first be rubbed with spirits of turpentine before the sketch is made, which may be drawn by pencil or crayon. A plate or flat plaque is recommended as the best subject for a beginner. The colours are diluted with spirits of turpentine or olive oil, though the former is preferred. Lists of pigments, and the composition of palettes for painting flower heads, and figures, landscapes, &c., is given, and there are some suggestive remarks on tinted grounds and decoration—the Japanese designs being advocated if we may judge from the vignettes in Mr. McLaughlin's guide, which is tastefully got up. *On a Circular System of Hospital Wards*, by John Marshall, F.R.S., Professor of Surgery in University College, &c., with illustrations by Percival Gordon Smith, A.R.I.B.A. (London: Smith, Elder, and Co.). This is a pamphlet suggesting a circular shape for wards, referred to by us the other day as read by the author at the Social Science Congress. The author shows a circular ward with beds alternating with windows round the outer wall, a central staircase, with nurses' and bath rooms forming a projection on one side, and connected by open corridors to a central administration block. While we admit a certain ingenuity and economy in the plan, we cannot agree with the theory of a large ward for 30 beds, and we are strongly of opinion that the smaller the wards the better for recovery in many cases. *A New Testament Commentary for English Readers*. By various writers. Edited by the Bishop of Gloucester and Bristol. (London: Cassell, Petter, and Galpin.) The second volume of this valuable work, dealing with the Acts of the Apostles, and the first four Canonical Epistles, seems in every way equal to the first volume, which took in the Four Gospels, and which we noticed in January last. We naturally hesitate to criticise the work of the able writers who have been entrusted with their respective tasks, but we thankfully recognise a breadth of thought and a depth of scholarship absent in many older commentaries, and badly atoned for by dogmatism and mere letter-worship. The printing and general appearance is quite equal to that of Vol. I. *The Church Builder*, 1878 (London: Rivington-), is the bound volume of our useful and interesting contemporary, whose quarterly numbers are always full of well-selected matter, and frequently contain valuable original communications. *Calvert's Mechanics' Almanack for 1879* (John Calvert: Manchester), is the first to hand for the new year, and undoubtedly the cheapest and best for all amateurs and handicraftsmen. The editor, himself an engineer and mechanic, has gathered together a vast amount of useful information, and has put it together with judgment and discretion.

CHIPS.

The Town Council of Cork decided on Friday, by 25 votes to 9, to adopt Mr. T. Caxton Fiddler's amended plan for rebuilding Anglesea bridge.

The parish church of Bassaleg is being restored at the sole expense of Lord Tredegar, from plans by Messrs. Habershon and Co., of London, Newport, and Cardiff. The old-fashioned pews will be removed and replaced by new benches, and a new floor laid. The columns and arcades are to be rebuilt in Bath stone, and the western organ gallery removed, and the instrument re-erected in the south-east angle of the nave. Mr. Alfred Williams, of Newport, Mon., is the contractor for masonry, and Mr. Linton, of the same town, for carpentry.

A new spire is about to be placed on the cathedral at Waterford, the dean having contributed £800 for the purpose.

The Dundee Town Council have adopted plans prepared by Mr. Alexander Tower, architect, in conjunction with Mr. M'Kelvie, the superintendent of cemeteries, for the laying out of the Law-hill, and making conical paths to the summit, at an estimated cost of about £1,000.

The Nottingham Town Council decided on Monday that it is expedient to acquire for the town the land known as Bulwell Forest, partly to be used as a burial ground, and partly as a place of recreation. A bill will be brought before Parliament on the question.

The Bridlington Local Board have determined to offer a premium of £20 for the best plan and report for erecting sea defences between Sands-cut and Sands-lane, Bridlington.

The annual distribution of prizes and certificates to the students in the Torquay science and art classes was made on Monday evening by Lady Clifford. The report was encouraging, showing not only an increase in the higher grade of pupils, but also a general elevation of the pupils towards the standard recognised by the Government department in capitation grants.

A memorial stained window to W. Michael Balfe will shortly be erected in the south aisle of St. Patrick's Cathedral, Dublin. The design is a figure of Erin, leaning on her harp and mourning over the musician and composer, a bust of whom she is crowning with laurel. The work is being carried out by Messrs. Ballantine, of Edinburgh.

In the quarterly report of the medical officer for Swansea, just issued, the dead-lock in sewerage, caused by the neglect of the urban authority to provide an outlet for certain sewers, is referred to in severe terms. The medical officer reports that there are in the outlying districts of Landore and Morriston, with a population of 8,000 persons, five miles of sewers which are inoperative and useless for want of an outlet.

The School Board for St. Ives, Cornwall, have received eleven tenders for building new schools, with or without master's house and board-room, proposed to be erected from the designs of the architect to the board, Mr. Silvanus Trevail, of Tywardreath.

A local committee has been formed in South Essex, to promote a bill next session for the formation of a railway from Southend to Maldon, through the Dengie Hundred. The length of line is about 18½ miles. The cost is estimated at £130,000 for an ordinary 4ft. 8½in. gauge, and £88,750 for a 3ft. gauge. The engineers are Messrs. Kinnipie and Morris, of Westminster chambers and Greenock, and the surveyor is Mr. J. W. Morris, of Gracechurch-street, E.C.

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ILLUSTRATIONS.

DESIGN FOR THE CHURCH OF THE ORATORY, SOUTH KENSINGTON—"GREAT ALNE," WARWICKSHIRE—NEW BOARD SCHOOLS AT NOTTINGHAM—VESTRY HALL, HAMPSTEAD—DETAILS OF COUTANCE CATHEDRAL.

OUR LITHOGRAPHIC ILLUSTRATIONS.

CHURCH OF THE ORATORY, SOUTH KENSINGTON, S.W.—"NON TIMETE."

THE drawings we illustrate this week were submitted by Mr. Albert Vicars, Somerset Chambers, 151, Strand, London, and Mr. John O'Neill, of 65, Upper Arthur-street, Belfast, and Dublin. The arrangement of this plan is simple. The sanctuary and sacristies are well arranged, and the galleries, communicating with house and giving access to singers and organ chambers well managed. The plan is cruciform, and has aisles on both sides, 220ft. in length, connected with a wide corridor behind the sanctuary, giving a complete ambulatory round the whole church. The nave is 170ft. long, sanctuary, 66ft. long, both having a width of 50ft.; width across nave, aisles, and chapels, 114ft.; across transepts, 121ft.; internal diameter of dome, 50ft.; height to ceiling of nave, 78ft.; to apex of inner dome, 140ft.; height of exterior of dome, 215ft. The internal columns, pilasters, and inlays were proposed to be of marble. Estimated cost, £105,000.

COUTANCES CATHEDRAL.

WE give the general drawings of the north-west tower of this cathedral, and plans of the several stages as promised on p. 448 *ante*. We are indebted for the drawings, together with those of the west towers which we illustrated in the BUILDING NEWS of Nov. 1, to Messrs. A. S. F. Kirby and W. S. Frazer.

HAMPSTEAD VESTRY HALL.

THE building is faced with red Bracknell bricks, having dressings of Portland stone, the roofs being covered with the Broomhall Company's brown tiles. Facing Belsize-avenue, on the north side, is a tower, which contains the side staircase, and the cisterns, with side-entrance door. The principal entrance is in the centre of the east front, facing towards Haverstock-hill, and is approached by a broad flight of steps. In dimensions the building is about 90ft. deep, and 64ft. wide. It comprises a basement story, containing kitchens, supplied with a lift and other conveniences, muniment and store-rooms, and a residence for the hall-keeper. On the ground floor, to the left of the entrance hall, stands the large hall for the meetings of the vestrymen, and to the right are the offices for the parish surveyor, while a broad corridor communicates with a spacious and well-lighted central staircase. Conveniently grouped for access and economy of space, the several business offices of the parish are placed around the staircase, giving accommodation for the vestry clerk's offices, the burial board, medical officer of health, superintendent registrar, with waiting-room, retiring-room for vestrymen, and strong room. The side entrance also communicates directly with the principal staircase. The public hall is on the first floor, over the front portion of the building; it is 61ft. by 41ft., and 30ft. high, and adjacent to it are disposed waiting-rooms, service lobby, retiring and cloak-rooms, &c., and also a large room in the rear for the use of committees. The floor of the public hall throughout is supplied with Dennett's arching, which has been treated ornamentally as a ceiling for the vestry hall under. The principal halls, corridors, and staircases are heated by means of hot water, the apparatus having been fitted up by Messrs. S. Eale and Sons, of Oxford-street. The lighting of the public hall and principal staircase is by means of sun-burners. The cost of the building, exclusive of fittings and boundary walls, has been about £11,000, and the works have been carried out by Mr. William Shepherd, builder, of Bermondsey; Mr. John Bragg has acted as clerk of the works. The fittings of the vestry hall (in walnut and maroon leather), and those of the surveyor's and other offices, have been entrusted to Mr. Turpin, of Bayswater. The lift was supplied by Messrs. Archibald Smith and Co., of Leicester-square. The architects are Messrs. Kendall and Mew, of 30, Doughty-street, Mecklenburgh-square.

REFERENCE TO PLANS.

A. Entrance-hall.
B. Vestry Hall.
C. Corridor.
D. Surveyor's offices.
E. Lavatories, &c.
F. Vestry-clerk's offices.
G. Superintendent registrar.
H. Waiting-room.
I. Medical officer of health.
K. Burial board.
L. Lift.
M. Principal staircase.
N. Strong-room.
O. Committee-room.
P. Waiting-room.
Q. Cloak-rooms.
R. Retiring-room.
S. Service lobby.
T. Tower and side stairs.

GREAT ALNE.

WE illustrate this week a view of "Great Alne," Warwickshire, recently exhibited in the Royal Academy, designed by Mr. G. H. Hunt, architect, of 27, Regent-street, S.W., and carried out under the direction and supervision of Mr. Geo. Hunt, sen., architect, of Evesham, for D. R. Ratcliff, Esq. The house, now nearly completed, stands in the middle of a large park, and at each end of the approach road is a lodge of different design, but in the same style, to be in keeping with the house. Stables, laundry, &c., are being erected some little distance from the house. Some cottages have already been built, and others designed to be carried out in the same style in different parts of the village.

DESIGN FOR SCHOOLS, HUNTER-HILL-ROAD, NOTTINGHAM.

THE Nottingham School Board lately invited designs in competition for four new Board Schools, and in that of one to be erected in Hunter-hill-road, they stated that they desired to build the graded schools on the Prussian or class-room principle. The design which forms one of our illustrations was submitted in competition by Mr. R. C. Clarke, of Nottingham, with Mr. T. Roger Smith, of London, as consulting architect. It was prepared by these two gentlemen on the understanding that Mr. Roger Smith should be mainly responsible for the plan of the design and Mr. Clarke for the architectural treatment. The design is based upon the commonly-accepted arrangement of school buildings in Prussia, as modified for the use of the School Board for London by Mr. Roger Smith in the large class-room school erected from his designs in Ben Jonson-street, Stepney. The main building, which is shown in our view and plan, forms a compact block of three stories in height. On the ground story is placed the infant school, together with a residence for the care-takers, and distinct entrances, staircases, cloak-rooms, and lavatories for the boys' and girls' schools. The first and second floors consist of class-rooms grouped round a central hall, and allotted to the different grades of the schools in proportion to their requirements. Teachers' rooms are provided, and as the central hall equals both the stories of class-rooms in height, a gallery thrown from end to end is made use of to give access to the class-rooms on the upper floor. Great attention was paid to left-hand lighting and to access, supervision, ventilation, and those minutiæ of arrangements upon which the success or failure of a school-house largely depends. The usual outbuildings were provided, detached from the school.

THE "GAIETY" RESTAURANT.

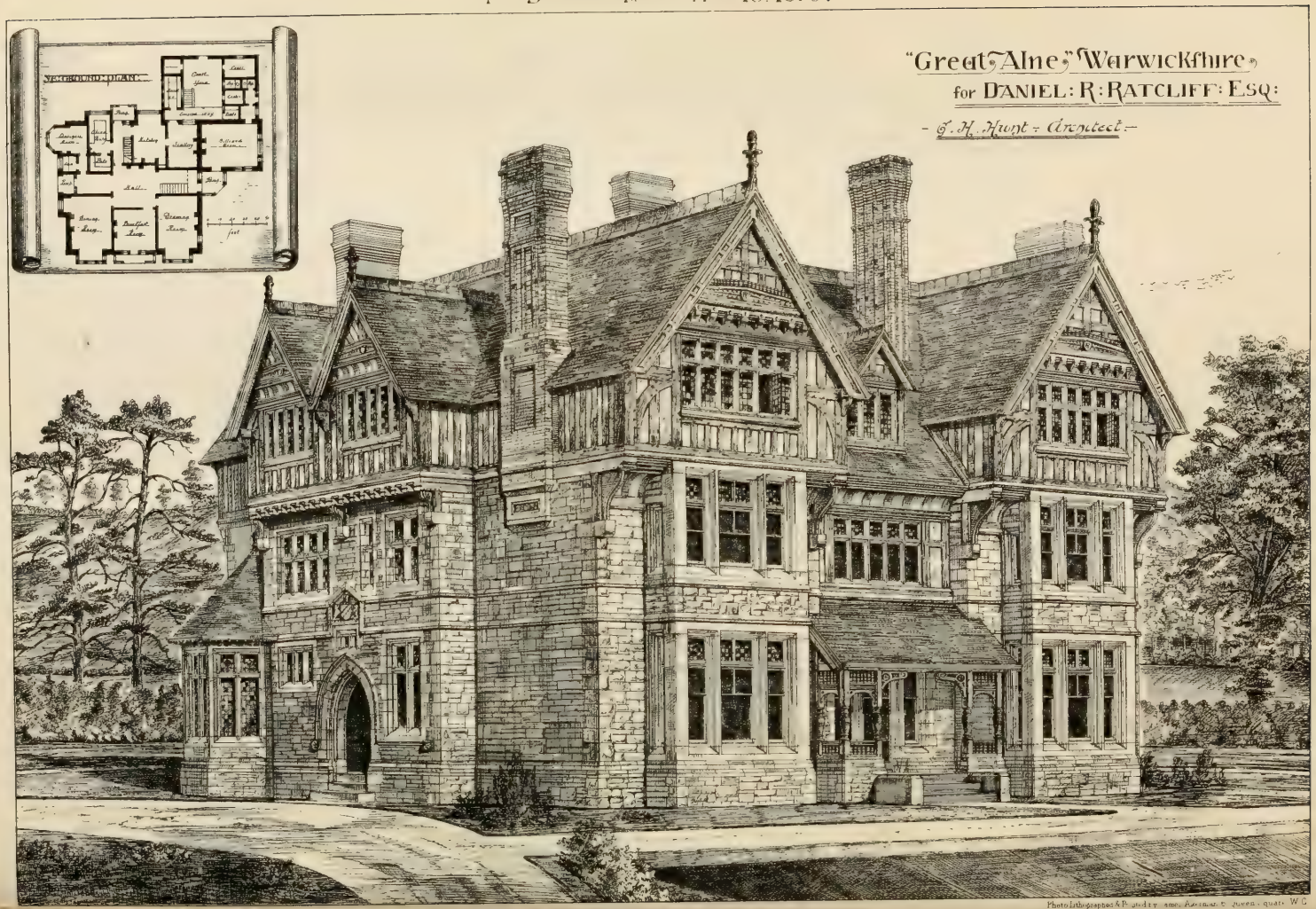
FOR some time past extensive alterations have been going on at the Gaiety in the Strand for Messrs. Spiers and Pond, the enterprising caterers, from the designs and under the supervision of Mr. T. Verity. The old building has been remodelled both internally and externally. We have inspected the new premises just opened to the public, and can say the new restaurant will add one more to the well-appointed series of establishments conducted by Messrs. Spiers and Pond in the metropolis. Entering by a spacious vestibule from the Strand, laid with mosaic, we first examine on the right the great luncheon buffet, which occupies the ground floor, lighted chiefly from Catherine-street, to which it forms an important corner range of building. This department is about 100ft. by 33ft., of lofty proportion, and is surrounded by marble counters—the fronts of which are of teak. The decorations consist of arched recesses, with mirrors in the centre behind the buffets—the upper portion of the walls being adorned with a series of tile paintings, emblematical of the progress of agriculture from the first clearing of the primeval forest to the harvest gathering; another series represent the progress of wine making. The windows on the Catherine-street side are lofty and numerous, their lower portions are filled with stained-glass representative of Shakespearian subjects, the upper lights being pivoted and opened or closed by cranks and levers. The ceiling is panelled and decorated in Kalsomine painting—a washable kind of distemper; the subjects are figures with scrolls and mottoes from dramatic authors, together with animal representations. We may add that the ventilation has been well attended to. Below the morocco seats of the buffet are gratings for the ingress of fresh air, and other interstices above the buffet, near the ceiling, form outlets, a shaft communicating with the latter. Serving-rooms are provided in proximity to this department, and these communicate with the kitchen at the top of building by lifts. The grill and supper-rooms are in the basement, and occupy the space beneath the buffet. The grills are at one end, screened off from the supper-room. We also notice lavatories for gentlemen, and beer and wine-cellars.

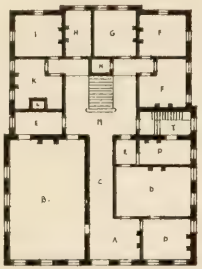
The table d'hôte occupies the first floor, and is a spacious apartment, with all necessary cloak-rooms, and there are set out a number of tables to be served every day at 5 o'clock. Near it are still and serving rooms. The ceiling of this room is rather marred by the difference of height, and the ceiling is panelled and painted. We have little space left to notice other rooms, the smoking-room, culinary department, &c., but the former is surrounded by ventilators near the ceiling, gas jets being kept burning to facilitate draught. We may especially remark upon the very complete system of lifts, fitted up by Messrs. Archibald Smith and Stevens, of Princes-street, Leicester-square, the details of which we hope to describe on another occasion, nor must we omit to notice the glass, supplied by Messrs. W. B. Simpson and Sons, of St. Martin's-lane, W.C., who also provided the tiles and decorated the ceilings. The contract has been carried out by Messrs. G. Smith and Co.

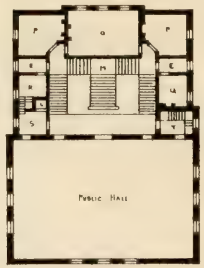
The foundation stone of a chancel, about to be added to St. James's Church, Preston, was laid on Wednesday week. Mr. J. Hibbert, who designed the nave and aisles already built, is the architect. The outlay will be about £2,000.

The county surveyor and architect, Mr. Robinson, has had completed, from his own plans, the bridges known as Blackbridge and Blackwater Back Bridge, near Ryde and Newport, in the Isle of Wight. These bridges, washed down last November, have now been erected and completed by Mr. F. A. Coker, contractor, Newport. "Series House," which is more generally known as the "Judges' Lodgings," has, at the command of the magistrates, also undergone within the past three months a thorough repair, re-decoration, and enlargement, and the work has been carried out under the designs and supervision of Mr. Robinson.

The Camborne Local Board have approved plans prepared by Messrs. Henderson and Son for the drainage and sewerage of the town on the filtration system, and have applied to the Local Government Board for a loan of £4,300 for carrying out the same.


"Great Alne," Warwickshire,
for DANIEL: R: RATCLIFF: ESQ:
- J. H. Hunt - Architect -
Photo-Lithographed & Published by Messrs. Kerslake, Queen-quay, W.C.





August, 1878.

VESTRY-HALL, HAMPSTEAD.

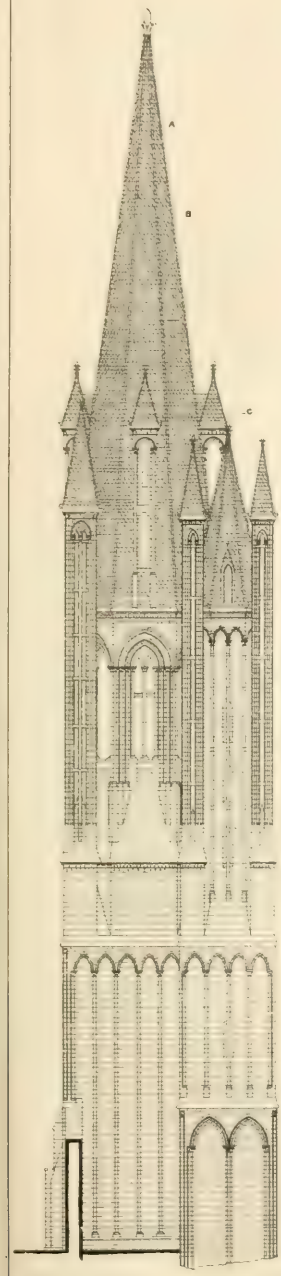
Kendall & Elew, Archts.

Photo Lithographed & Printed by Isaac Akerman, 6 Queen Square W.C.

Coventry Cathedral

MEASURED JULY 1877

NORTH WEST TOWER.

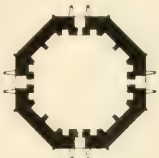


NORTH ELEVATION

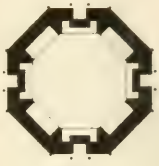
PLAN A

PLAN B

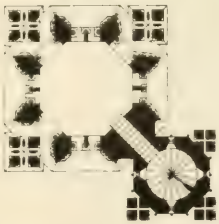
PLAN C.



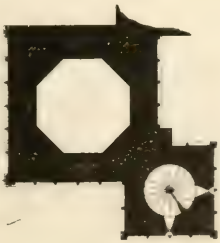
PLAN E.



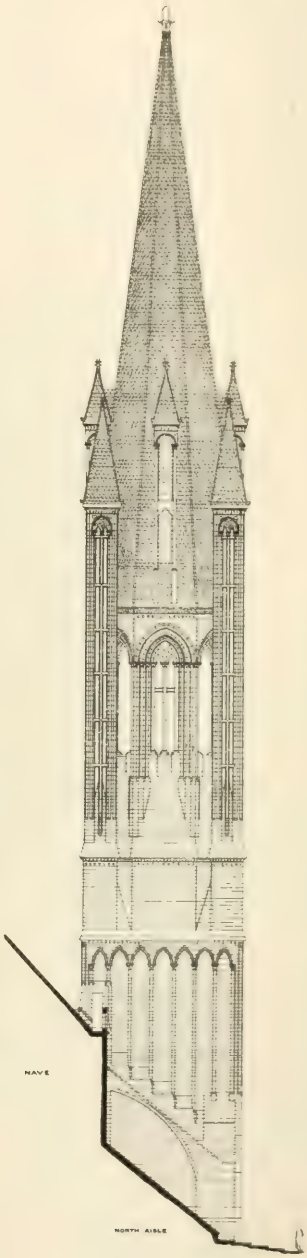
PLAN F.



PLAN G.



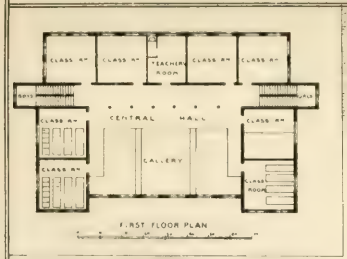
PLAN H.

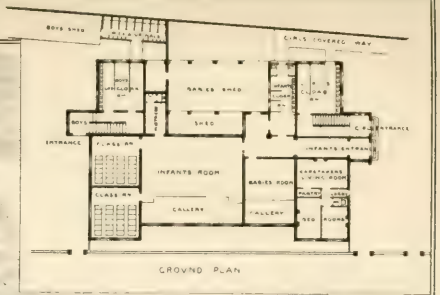


EAST ELEVATION

MEASURED BY A.S.F.KIRBY & W.S.FRASER
DRAWN BY A.S.F.KIRBY.

NOTTINGHAM SCHOOL BOARD · *New Schools* · HUNTER HILL ROAD





DESIGN BY T. ROGER SMITH & R.C. CLARKE ARCHTS

COMPETITIONS.

CARMARTHEN.—In response to advertisements for designs for a lychgate to be erected at the King-street entrance to St. Peter's parish church, Carmarthen, as a memorial to the late Rev. L. M. Jones, 30 sets of plans have been received, and were on view at the School of Art in that town on Saturday. From these half a dozen were selected by the memorial committee for the final decision of the Bishop of St. David's, who is acting as arbitrator. The sum to be expended is about £350.

CHORLTON.—At a meeting of the Chorlton Guardians, on Friday last, a report on the proposed erection of new cottage school-houses at Withington workhouse was considered. The committee some time since instructed Mr. H. G. Goldsmith, of Manchester, to prepare plans for the erection of six blocks of school-houses, with suitable buildings for schools and administrative arrangements. Mr. Goldsmith visited and carefully inspected the schools at West Ham, and as a result produced a set of plans which fully carried out the ideas of the committee, except as to the cost, which the architect estimated would be £19,800. Further consideration of the question of cost induced the committee to seek a solution of the difficulty by obtaining plans from other architects, and a premium of 15 guineas was offered to each of the following—namely, Mr. L. Booth, Messrs. Mangnall and Littlewoods, Messrs. Nicholson and Mottram, and Mr. E. W. Charlton. All the plans were sent in on the 9th October, and they have received the careful consideration of the committee at several meetings held for the purpose. The estimated cost of the buildings proposed by Messrs. Nicholson and Mottram, £17,600, and by Mr. Charlton, £17,000, induced the committee to put their plans out of the competition at an early stage. The plans submitted by Mr. Booth and Messrs. Mangnall and Littlewoods were almost equally effective in character, and the estimated cost of the former was given at £15,770, and the latter at £12,970. Neither of the two sets of plans provided exactly what the committee desired, and after carefully considering which set could be most easily adapted, the committee selected the plans of Messrs. Mangnall and Littlewoods, and requested those gentlemen to make the necessary alterations and additions. These were subsequently submitted to the committee, with a statement that the entire cost would be increased by a sum of £1,500, making the total estimate of cost £14,470. The report was adopted.

PENZANCE FLOATING DOCK.—A special meeting of the Penzance Town Council was held on the 6th inst., to consider the report of a committee as to the designs received in competition for a floating dock and connection of north and south piers. In response to an offer of £50 premium for best design 22 sets of plans were received, and of these 13 had been eliminated as unsuitable. That sent in under the quaint motto, "Let every herring hang by its own tail," was unanimously adopted, and on opening the sealed envelope was found to be by Messrs. Beardmore and Barnes, of Great George-street, Westminster, and Mr. R. H. Twigg. The drawings showed a dock of 3½ acres in extent, having a 50ft. entrance, with one pair of gates, and a swing-bridge in two leaves over same; the depth will be 2½ft. below low water. The remaining work will consist of 600ft. of quay wall, supporting a 30ft. wharf-side wall, with connecting iron swing-bridge. The cost is estimated at £25,000.

PERTH.—The committee of the North U.P. Church, Perth, recently invited designs for the erection of a new church. A large number of drawings were received, and Mr. Dick Peddie, of Edinburgh, was consulted and reported upon them. With Mr. Peddie's report to guide them the committee again gave the drawings their careful attention, and came to the decision of adopting the design prepared by Mr. T. L. Watson, I.A., architect, Glasgow, and this gentleman has accordingly been instructed to proceed with the contract drawings. The style of the new building will be Italian, and the estimated cost is £7,000.

SKEGNESS PIER.—For the erection of a pier at Skegness, Lincolnshire, a limited liability company recently offered a prize of £50 for the best design. A spirited competition resulted, 44 engineers sending in designs. The directors of the pier company selected the following five for further consideration:—Mr. T. Claxton Fiddler, Westminster; Messrs. Page and Marwood, Cardiff; Messrs. Clarke and Pickwell, Hull; Mr. T. W. Smith, London; and Messrs. Head, Wrightson, and Co., Stockton-on-Tees. At a subsequent meeting of the directors the designs of Messrs. Clarke and Pickwell were unanimously selected for adoption.

SCHOOLS OF ART.

SHEFFIELD.—The annual meeting of the Sheffield School of Art was held last week. The report of Mr. William Cox, the head master, stated that during the past year an effort had been made to enable the students to attain the higher degrees of proficiency necessary, and the results show that 156 students were examined and passed 102 papers successfully, as compared with 194 examined and 63 papers passed at the previous examination. In the third grade the year's work of the students (which was sent up to South Kensington in April last) appeared fully equal to the work of former years, but fewer prizes were obtained, especially in the national competition. The class for designers has been well attended, and some of the designs have been carried out in the manufacture of the articles designed during the past year.

Mr. Mark H. Judge has been appointed curator of the Parkes Museum of Hygiene at University College, London, the arrangements in connection with which, it is understood, are so far completed that it is expected the museum will be opened early in the new year.

At a meeting of the Common Council of the City of London last week an elaborate report was presented by the committee to whom the question had been referred, upon the erection of a new bridge over the Thames near the Tower. The committee recommended the erection of a low level bridge with a central span, which would open for the passage of ships. After considerable discussion the report was rejected by a majority of 92.

Mr. James Neale, F.S.A., who is commissioned by the Dean and Chapter of Canterbury to repair and preserve the remarkable paintings recently discovered in the crypt of Canterbury Cathedral has made several experiments and examinations of similar work. In the course of his report Mr. Neale details the results of an experiment illustrating the chipping effect of some solutions. Mr. Neale will, during the forthcoming session, read a paper before the Royal Institute of British Architects, touching on this subject.

The Queen has directed that the old tapestries of Holyrood Palace, which are in a very dilapidated condition, should be restored at the Royal tapestry works, Old Windsor.

At a meeting of the Lowestoft Improvement Commissioners and Urban Sanitary Authority, held on the 14th ult, instructions were given to Mr. R. H. Inch, C.E., town surveyor, to prepare plans, &c., for a complete system of sewerage for the whole district.

On Monday, memorial stones were laid of a new chapel now being erected at Redwick, near Bristol, by the United Free Methodists. Its interior is only 33ft. in length, 27ft. in breadth, and 12ft. in height. The construction will be of local stone with Cattybrook bricks. The drawings of the chapel were prepared by Mr. John J. Geach, the resident engineer of the Severn Tunnel. The building is intended to seat 250 people, and the cost will not exceed £500.

On Thursday week a complimentary dinner was given to the Mayor of Stoke at the North Staffordshire Hotel. The banquet was held in the new dining-room, which was used for the first time on this occasion. The additional building has been designed by Mr. W. H. Stubbs, the engineer to the railway company, and erected under his superintendence by Mr. J. Gallimore, of Newcastle. The room is 78ft. long by about 30ft. broad, and will seat 150 comfortably.

Dr. Lee, incumbent of All Saints', Lambeth, appeared on Monday in the Queen's Bench Division to show cause against a rule which had been obtained by the Metropolitan Board of Works for a mandamus commanding Mr. Partridge, a metropolitan police magistrate, to issue a warrant to levy on the reverend gentleman a sum of £100 for repairs done to his church. The Lord Chief Justice said the Building Act never contemplated that an outlay of this description should be shifted from the parishioners upon the incumbent. He therefore dismissed the rule.

Building Intelligence.

ASKE.—Great improvements have been effected of late upon Lord Zetland's estate at Aske, near Richmond, in Yorkshire, and also upon the property belonging to Lord Zetland in Richmond itself. The old King's Head Hotel in the Market-place at Richmond, which a short time since might have been likened to a rabbit warren, so intricate were the windings of the internal corridors, and so dark and mysterious the staircases, has been transformed into a bright and cheerful modern hotel, with a central stone staircase, a handsome entrance-hall, and all the appliances required by modern life. At Aske Lord Zetland has replaced his old stables, which were scattered about around the hall and amongst the out-buildings, by a magnificent block for about 100 horses. The private chapel at the hall has recently been opened by the Archbishop of York; the interior is rich in marble, mosaic, carved oak, stained glass, and elaborate brass work. In addition to these works, his lordship has been extensively rebuilding his Richmond property, and we notice that a handsome range of shops, with estate offices over, are now in course of erection in King-street. The architect for the whole of the works is Mr. Thomas Oliver, of Newcastle-on-Tyne.

DUBLIN.—New premises, to be known as the Metropolitan Christian Union Buildings, are in course of completion in Lower Abbey-street. They cover a piece of ground having a street frontage of 101ft. 6in., and a depth of 100ft. The front and sides are of red brick, with bands and dressings of stone, and of blue and white brick. On the ground floor is a lecture-hall approached by wide and lofty entrances. The hall is surrounded by a gallery, and has also a platform and reporters' gallery. It is lighted by four sun burners in the roof, and heated by hot-water pipes. Adjoining is a smaller hall divided from the large one by removable sliding partitions, thus affording in the two rooms accommodation for 4,000 persons. On the same floor are committee-room and tract depot. Two wide staircases lead to the gallery of the large hall, and also to the library, and suite of class-rooms above. In the basement are kitchen and other accommodation, housekeeper's and caretaker's rooms, young men's parlour, and a refreshment-room, laboratory, plunge bath, bowling alley, and gymnasium. Messrs. Gahan and Son, of Harcourt-street, are the contractors, and Mr. Alfred C. Jones was the architect. Messrs. Sloane and Son supplied the heating apparatus.

HALKYN.—The new Church of St. Mary the Virgin, at Halkyn, Flintshire, was consecrated on Tuesday week by the Lord Bishop of St. Asaph. The church, together with the churchyard, boundary walls, and lych-gate, is entirely the gift of his Grace the Duke of Westminster, K.G., who has spared no expense that everything may be carried out in as complete a manner as possible. The style of the church is Geometrical. The plan consists of nave, north aisle, chancel, and a tower 26ft. square placed at the north-east end, and provides accommodation for 300 people. The walls, both inside and out, are of stone, and oak has been used for all the timber work. All the windows are filled with painted glass. The reredos is of oak, and is an elaborate specimen of architectural woodwork; the upper part under the canopied top is divided into seven compartments; these are filled with paintings, the one in the centre containing a representation of the "Last Supper," and the side ones the "Annunciation," and "Our Lord as the Good Shepherd," with the "Lord's Prayer," "Creed," and "Decalogue" on either side. These paintings, together with the painted glass, are by Messrs. Heaton, Butler, & Bayne. A fine organ, by Whiteley, of Chester, has been provided, and the tower contains a peal of six bells, and a clock with faces on the east and west sides. The architect was Mr. John Douglas, of Chester.

HEWORTH, DURHAM.—On Monday, the 11th inst., the second group of schools erected by the Heworth Board were opened at Bill Quay. Accommodation is provided for 550 scholars, and the mixed principle of teaching for boys

and girls has been adopted, the main and class-rooms being so arranged that from the former the head-teacher can exercise supervision over the department. The aspect of each room in which teaching has to be carried on has been arranged in such a manner that direct sunlight shall enter during a considerable portion of each day. The ventilation is by vertical inlet tubes, opening at about 6ft. 6in. from floor for admission of fresh air, and by sheet-iron tubes above ceilings for extraction of vitiated air. The latter tubes are taken to central cylinders placed in turrets over the two main rooms, where provision is made by powerful Bunsen burners, lighted by electricity, for the rarefaction and expulsion of the vitiated air. The heating is effected by means of hot-water pipes and coils worked from a boiler centrally placed in basement. Externally the schools, with the caretaker's house, are executed in red pressed bricks, with black brick bands, stone dressings, and slated roof. The contract has been carried out by Messrs. Carr, under the supervision of Mr. Lowes, clerk of works, at a total cost of £5,500. Messrs. Walker and Emley were the contractors for the warming and ventilation. Mr. Thomas Oliver, of Newcastle-on-Tyne, was the architect.

High Bray, Devon.—The church of High Bray, which has, during the last eight months, been renovated and repaired from plans by Mr. Ashworth, was reopened on the 31st of October. The chancel walls have been rebuilt, and a good portion of the tower buttresses and parapets reconstructed, and facing amended; the windows are rebuilt chiefly in the local stone. The tower has been thrown open to the church, and the west window enlarged to its original design. A screen has been formed under the tower arch of remains of an old screen. The font, the pillars, and arches, and other features have been cleansed and repaired. The ceilings have been divided into compartments by moulded ribs. Entire new floors have been laid in Langport stone for the avenues, and Minton tiles for the sacrarium. The seats are of simple design, and these and the pulpit are of pitch-pine; the altar, prayer desk, and lectern of oak. The contract for the works generally has been carried out by Mr. John Cock, jun., of South Molton; the stonework by Mr. J. Pulsford, of Barnstaple. The outlay is about £900.

Landbeach.—The parish church of Landbeach, Cambs, was reopened on the 1st inst. after restoration, carried out from the plans of Messrs. George Wood and E. F. C. Clarke, joint architects. A new vestry and organ chamber have been built. The whole of the seats and fittings have been removed from nave and chancel—all old work being carefully preserved and re-used. The floors have been taken up, and re-laid with boarding under seats and tiles in passages. The walls of nave and aisles have been repaired, the foundations have been underpinned where necessary, the decayed portions of the roof timbers have been taken out and replaced with new oak; the whole of the roofing lead has been stripped off, re-cast in sheets, and re-fixed, and the interior stonework of nave, aisles, arcades, tower, and chancel arches have been freed from colour wash. The work to tracery in windows, to tower floors, belfry, and bells has been postponed till further funds are raised. The contract for restoration has been carried out by Mr. H. Clipsham, near Norwich. It amounted to £1,850.

Manchester.—The work in connection with the building of the Nicholls Hospital was commenced last week. It is about 13 years since rough sketches for the institution were prepared for Mr. Nicholls by Mr. T. Worthington, architect, of this city, and that gentleman has now drawn the plans. The building will be Gothic in style, with transoms and handsome stone dormers on the top story. The material will be brick, with cavity walls faced with best stocks, and stone dressings and finishings from the Moor End quarries at Halifax. Over the entrance is corbelled out a bold oriel window two stories high, terminating at the top in a niche, and on each side of the principal entrance are other niches, in which will be placed statues of the founder and two other members of his family. In the centre of the façade, above the oriel window, rises the tower to a height of 130ft., with overhanging parapet and angle turrets, and stone dormers. It is expected that the foundations will be put in during the present autumn, and that the contractor (Mr. W. Southern, of Salford) will have the building completed by the end of next year.

Marple.—The corner stone of the new parish church of All Saints, Marple, was laid on Saturday week. The plan comprises a broad nave, chancel of same width, south chancel aisle to be used as organ chamber and vestry, aisles to nave, western narthex divided by an arch so that the northern portion forms a baptistery and the southern a porch, and a western tower. The style is Early Geometrical. The church is to be built of ashlar stone—the internal wall-surfaces being plastered. Advantage is taken of the natural rise in the site to lay the nave floor so as to slope 18in. upwards from west to east. Accommodation is provided for 650 adults, at a cost of £6,000. Messrs. Medland and Henry Taylor are the architects.

Metropolitan Board of Works.—On Friday a numerous deputation from inhabitants of Paddington and Marylebone, headed by Sir T. Chambers, M.P., presented a memorial asking that the board would acquire a piece of land, 94 acres in extent, lying between Portsdown-road and Sutherland-gardens, as a public park. The memorial, which is supported by both the vestries of the district, was referred to the works committee for consideration. The same course was adopted with reference to a memorial from the inhabitants of Kilburn, Hampstead, and St. John's-wood, complaining of the inadequate capacity of the sewers. It was agreed to grant permission to the Poplar district board to borrow £3,000 for improvements in Devon's-road, Orwell-road, and St. Leonard's-street; to Islington vestry £4,870 for erecting stabling and workshops in Liverpool-road; and Camberwell guardians £10,000 for completing the new workhouse. The engineer having reported as to a settlement in a portion of the N.W. angle of Barking reservoir, the general contractors were directed to make it "temporarily secure" by shoring, at a cost of £500. Designs, submitted by Mr. J. Wolfe Barry, for bridges carrying the Fulham Extension of the Metropolitan District Railway over King's-road and Munster-road, Fulham, were conditionally approved, as was also a design submitted by Mr. T. B. Robbins, of a bridge to carry West-end-lane, Hampstead, over Kingsbury Extension of Metropolitan and St. John's-wood Railway.

Rainford.—The new parish church of All Saints, Rainford, was recently consecrated. The church is in the Gothic style, its total length being 113ft. 6in. by 48ft. 2in. wide, the total height to the pitch of the roof being 46ft. The church is divided into nave, chancel, and two aisles, the former of which is 77ft. long, the chancel being 31ft. deep by 19ft. wide. On the south side of the chancel is a small chapel, which is faced on the north side by an organ chamber, in the rear of which is the vestry. The edifice is built of Runcorn stone, relieved with red stone bands and dressings. At the north-east corner of the building is a tower, which is 18ft. square at the base, but at present is only carried to a height of 26ft. The building is capable of accommodating about 550 persons. The architects for the building were Messrs. Aldridge and Deacon, of Liverpool, and the contractor Mr. Hugh Yates, of Liverpool. The estimated cost of the building is £5,449.

Rushall, Norfolk.—The parish church of this small village, which has been in an unsafe condition, was reopened last week, after partial restoration. An entirely new open-timbered roof of pitch-pine has been erected; it is covered with green slates, and has Macfarlane's improved eaves' gutters. The whole of the external masonry has been cleansed from plaster, and pointed, and new buttresses erected to chancel. The tower has been partly restored, and new crosses and coping added to east and west gables of the church. Three new windows have been opened in chancel, and all the windows glazed with cathedral glass. The inside walls have been plastered and stuccoed, the floors laid with Minton's tiles, oak altar-rail, with brass and iron standards, and new carved benching erected in chancel, whilst in the nave chairs temporarily replaced the unsightly high pews. Gidney's warming apparatus has been introduced. Mr. George Grimwood, builder, Weybread, was the sole contractor; the stonework was done by Mr. Nursey, and the glazing by Mr. Gibson, of Fressingfield. The architect is Mr. E. M. Phipson, of Norwich and Ipswich.

St. Dogwell's, Pembrokeshire.—This church, which has been under a process of gradual repair and restoration for several years past, was reopened on the 4th inst. One of the principal and most recent improvements has been the lowering of the floors some 18in., preparatory to fitting up the interior with open pitch-pine seats, thus restoring the original height of the arcade, exposing the bases of the columns to view, and presenting the interior in its ancient proportions. The contractor for the more recent works was Mr. W. Balcombe, of Kenilworth, working under the superintendence of the architect, Mr. E. H. Lingen Barker, of London, Hereford, and Tenby.

Stoke-upon-Trent.—On Thursday week the Free Library at Stoke-upon-Trent was opened. The building consists of two departments—namely, that to be used exclusively for library purposes, and the other originally intended to be devoted to the uses of a restaurant. The latter is in a basement, and contains a dining-room 50ft. long by 27ft. wide, kitchen, scullery, stores, cellars, pantries, and lavatories. The free library portion contains a large room, which will provide for reading-room, museum, and library. It is 50ft. in length, 27ft. wide, and 23ft. high to the ridge of the roof. The new buildings occupy a site between the Minton Memorial Building and Bath-street, and form one group with the Minton Memorial Building. The style of this building has not, however, been followed in the design of the free library, which will be mostly of brick, treated freely after the manner of Queen Anne work. The estimated cost is about £3,200, exclusive of fittings. Mr. Gallimore, of Newcastle-under-Lyme, was the contractor; and Mr. C. Lynam, of Stoke-upon-Trent, the architect.

Walsall.—The new Cottage Hospital buildings at Walsall was thrown open to the public on Tuesday. The buildings are erected on the site of the old hospital, and a considerable part of the grounds which were connected therewith, the style of architecture being that in vogue in the days of Queen Anne, and the materials used externally being red bricks, built hollow, and Staffordshire tiles for the roofs. To each ward is attached a bath-room, a Moule's earth-closet, a lavatory, and a sink. The corridors are glazed along the sides, and laid with Maw & Co.'s tiles. A liberal allowance of space to patients has been made, viz., 1,000 cubic feet of air and 36ft. superficial floor space to each bed, and the arrangements with regard to ventilation and warming are effected with Shillito and Shorland's patent Manchester grates. All the locks and door furniture for upwards of 130 doors were supplied according to the architects' specification by Mr. James Hill, of 37, Upper Thames-street, London. The architects of the building were Messrs. Henman, Harrison, and Perrott, 9, Bedford-row, W.C. The builder was Mr. Daniel Moore, of Walsall.

Whilton.—On the 31st ult. the bishop of the diocese consecrated a new chancel, which is part of the work of restoration now going on at Whilton Church, Northamptonshire. The architect is Mr. J. P. St. Aubyn. The new chancel has a three-light east window, with geometrical tracery, and a two-light window on the south side, glazed with cathedral-tinted glass. The floor of the chancel is laid with Godwin's encaustic tiles, and the roof is open. The dimensions are—25ft. long by 16ft. wide, with south chancel aisle 12ft. by 6ft., and vestry and organ chamber on the north side 16ft. by 7ft. A flying arch connects the chancel aisle with the nave aisle, and for that and the new chancel arch, and indeed the whole of the the work, yellow Harlestone stone has been used. This part of the work was begun in May last by the builder, Mr. Gee, of Daventry, and has cost £1,500. Next spring the nave will be proceeded with, the total estimate for the work being £2,300. When completed there will be a nave 45ft. long by 15ft. wide, south aisle 30ft. by 7ft. and north aisle 32ft. by 10ft.

WIDNES SCHOOL BOARD.—On Friday week the third of the new school buildings erected for the above board, at Simm's-cross, was opened. The school provides accommodation for 800 children, with an average allowance of 10 superficial feet per child. The contract has been carried out by Messrs. Carlile and Co., from designs by and under the superintendence of Messrs. F. and G. Holme, architects to the board.

WILBY.—The parish church of Wilby, Northamptonshire, was reopened, after restoration, on Tuesday week. Architecturally the church possesses few remarkable features, with the exception perhaps of the tower, which is an excellent specimen of the Perpendicular style. The tower is supposed to have been added to the church about the middle of the 15th century, the other portions of the building being about two centuries older. The tower and belfry have been restored, and the old pews replaced by open pitch-pine seats. The church has been reroofed with open timber, the canopy of the sanctuary re-decorated, and the church throughout has been thoroughly cleaned and renovated. Mr. W. Scott, of London and Northampton, was the architect, and Mr. George Goodridge, of Roade, was the builder.

The annual general meeting of the Royal Scottish Academicians was held on Wednesday in Edinburgh, when the following gentlemen were elected associates:—Mr. Robert Gibb, Edinburgh; Mr. Robert Alexander, Cramond; and Mr. W. B. Hole, Edinburgh.

The mission-room, &c., in connection with St. Saviour's, South Hampstead, was opened on Saturday last by the Lord Bishop of London. The accommodation provided includes a room, 51ft. by 24ft., class-rooms, porches, &c. The total cost of the new building is £1,800. The architects were Messrs. Batterbury and Huxley, of 25, Great James-street, Bedford-row, W.C., and the builders Messrs. Manley and Rogers, of Regent's-park, N.W.

For the third time within thirty years the tower of the parish church of Week St. Mary, North Cornwall, was on Saturday night struck by lightning and demolished. Some £2,000 will be needed for the restoration of the church.

In "Some East Anglian Worthies," in *London Society*, it is suggested that the round towers of Ireland and England, which have puzzled archæologists, are really "wells," left high and dry by the sinking of the land.

At the consecration of St. Mary's Church, Stalbridge, Dorset, which has been restored at a cost of £2,600, by Mr. T. H. Wyatt, the Bishop of Salisbury said that in the matter of restoring churches they could see how well each generation thought of itself. He did not know what their children and grandchildren would say about their restoration of churches; perhaps they would say it was all wrong, and some new form of restoration would be required before long.

The Wandsworth District Board of Works adopted a report from a committee on Wednesday week, deciding for the future to have only brickwork sewers in the main thoroughfares, but to permit the use of pipe sewers in subsidiary streets.

The vestry of Limehouse, E., has obtained the sanction of the Local Government Board to the proposed erection of a vestry hall at an estimated cost of £8,000.

The Merthyr School Board have appointed Mr. John Thomas, of Merthyr Tydvil, as clerk of works.

A stained glass two-light window at the east end of the workhouse chapel, at Cookham, near Maidenhead, has been filled with stained glass as a memorial to the late matron. The subjects are the Baptism and Nativity of Our Lord, and His Presentation in the Temple and Crucifixion. The work was carried out by Messrs. Clayton and Bell, of London.

The guardians of St. Saviour's, Southwark, have adopted—subject to the sanction of the Local Government Board—plans prepared by Messrs. Jarvis and Son, of Trinity-square, of improvements at Christchurch workhouse, estimated to cost £1,000.

The annual meeting of the Wiltshire Archæological Society was held at Devizes on Wednesday week. The report mentioned the death of twelve members during the year, and added that the great work of the society, in 1878, had been the enrichment of the museum by the deposit therein—by permission of Sir Henry Hoare—of the noble Stourhead collection of antiquities, forming the spoil of the barrows on the Wiltshire Downs.

The Local Board of Driffield, Yorkshire, have definitively adopted plans prepared by Messrs. Oldham and Bohn, engineers, of Hull, for the drainage of the district, and have invited tenders for the work.

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[We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.]

All letters should be addressed to the EDITOR, 31, TAVISTOCK-STREET, COVENT-GARDEN, W.C.

TO OUR READERS.—We shall feel obliged to any of our readers who will favour us with brief notes of works contemplated or in progress in the provinces.

Cheques and Post-office Orders to be made payable to J. PASSMORE EDWARDS.

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R. A. H. (The roofing felt advertised in these pages by Engert and Rolfe, of Poplar, is the best material you can use. It is cheap, easily fixed, and lasting.)

"BUILDING NEWS" DESIGNING CLUB.

Next week we hope to publish the villa design to which we have awarded the second place.

T. H. C. (It is not absolutely necessary to do so if it can be arranged more economically.)—EAST ANGLIAN, "Amphion." (We cannot please everybody—it would be as impossible as impolitic to do so; the hesitation expressed in your last remark must apply to your confidence in your own resources.)

Correspondence.

OAK *v.* OAK.

To the Editor of the BUILDING NEWS.

SIR,—Mr. Chapman, in your issue of October 25th, opens the question of the two species or varieties of oak as was done at the discussion on my paper at the Institute. I have hitherto neglected it, because it seemed to lead one away from the simple question of the use of chesnut; but, lest it should be thought that there is more in the question than there really is, I will now give a general outline of it.

Botanists have long recognised two varieties of the oak. *Quercus robur*, one which is by far the most common, except in particular districts, has leaves rather narrow, deeply jagged, and set close to the shoot; its acorns are carried on a long stalk about 1½in. long. The other has stalked leaves, broader, less deeply cut, of a richer and more shining green, and its acorns are set almost close to the shoot. These differences are clear enough when one has been shown them in very marked specimens; but, after all, they are small, and none but a botanist would trouble about them. Yet some botanists have thought they marked distinct species, calling the common one, whose acorns stand on a stalk or "peduncle," *Quercus pedunculata*, and the other, whose acorns "sit" close to the stem, *Q. sessiliflora*, while they call a form which comes between these two *Q. intermedia*. But unfortunately one finds all degrees of variation between the two extreme forms; and so, while it is interesting to notice them, it does not seem possible to make any distinct species out of them. And, indeed, foresters have raised very marked varieties of oak from the acorns of a single tree.

If you were to publish the opinions which I now have by me, in print and in letters, from well-known authorities, they would fill a double number. I find the strongest assertions that the common form (or *pedunculata*) is more handsome as a tree, taller, of quicker growth, tougher, more durable in and out of water, and indeed the only form that ought to be used. I find exactly the same merits ascribed to the rarer *sessiliflora*, with the addition that its rarity is owing to its having been *exclusively* used in the middle ages, so that it was then nearly exterminated. Now as regards the appearance of the tree, as it grows, it is manifest to any one who looks at a large number that neither side can claim a victory. Why, then, should one put more faith in the statements as to the quality and durability of the timber—a matter much more difficult to decide, and as to which I at least can find nothing beyond assertion, when evidence is essential? Loudon's statement that *sessiliflora* is so deficient in the medullary rays producing the silver grain as not to be distinguishable at first sight from chesnut is a common statement, but it cannot be literally true, for we never find oak, either old or modern, that does not show the silver grain very distinctly indeed when it has been properly cut "on the quarter," though in some specimens it is more distinct than in others. I should be sorry to say that the external differences I have noted are not accompanied by some internal differences, but we want evidence of this from a large number of specimens, and unless landowners will allow their trees to be cut down for the purpose of gratifying scientific curiosity, I don't see where the evidence is to be got. Meanwhile, to assume that every specimen which has the silver grain sparingly developed is of the variety *sessiliflora*, as has been done in such cases as that of the Westminster Hall roofs, is quite premature so far as I know. The proofs which I brought before the Institute, showing the superior resistance of the silver grain to ordinary decay, the attacks of the worm, and wear and tear, as well as the way in which it adds stiffness to the wood, go against the notion that our best roofs are of the variety *sessiliflora*.

Having had good opportunities of studying this question scientifically with botanists, and practically, I believe that it has very little interest for the architect, for if he depends upon the careful selection of seasoned timber he will be doing exactly what the ancient carpenters did, they having known nothing of these distinctions I have described, and having been so far as we can ascertain remarkably free from the fancies of their less practised, and therefore less practical, successors.—I am, &c.,

THOS. BLASHILL.

PURSUING A SHADOW.

SIR,—I would call attention to a very common form of "fudging" in the effective and pretty style of pen-and-ink illustrations contributed to your journal. Solid and bulky erections are made to part with their shadows after the manner of Peter Schemill. Note specially the view of Tebay Church in yours of the 8th inst. How is it that the tower, of some 12ft. projection, casts no shadow upon the chancel wall? The porch casts a palpable shadow, as also the small buttress near tower. There are several other very glaring errors of shading that I could point out; but while on this topic I may further illustrate my point by drawing attention to similar fudging in the view of St. Margaret's Church, Ilkley, in your paper, May 18, 1877. I have the more reason for doing this, on account of the drawing being the work of an A.R.A., and an exhibit at the Academy, besides being commended in glowing terms by you. Here the same objection arises that I note in Tebay Church. The transept, some 13ft. deep, casts a mere streak of a shadow, about equal to the buttress, of 2ft. or so—in fact, a pier of the recessed arcade, some 9in. deep, has a shadow of equal depth to them all, while to the porch the shadow is more honestly rendered. I think we have a right to some-

thing more accurate from a master in his profession, especially as his style (errors and all) is so slavishly copied. I could, of course, multiply instances by the score from drawings from the same hand and others, but have no wish to trespass on your valuable space.

It is no answer to this to say they are only to be regarded as "sketches." Incompletion does not cover gross and palpable inaccuracy, and besides, there is a very great amount of method in the madness of these artistic and effective renderings. It is done for "effect." The reason in these cases is that the shadows put in properly would interfere with the "breadth of light" aimed at, and be fatal to effect sought to be given to the work. You may easily see this by putting the shadows correctly, and shading in pencil, whilst to buttresses and small projections the strongly-defined shadow is wanted to emphasise the projection, and is put in accordingly, whether correct or not. This is a poor contrast to the conscientious and laboured way that French draughtsmen show their shadows. There used to be a great deal of comment (much of it undeserved) some years past upon the flashy and tricky way our water-colour draughtsmen illustrated their views of buildings, but they did not commonly omit shadows by the wholesale, and after all, an "accidental" or imaginary shadow from a passing cloud is a more legitimate and honest artifice than the glaring liberty taken with the sun that I have indicated in my letter.—I am, &c., B.

THE CREWKERNE GRAMMAR SCHOOL COMPETITION.

Sir,—I have just read the instructions to architects in the case of the Crewkerne Grammar School Competition, and foward you the following extracts from the same, with a few remarks thereon, in order, if possible, to prevent young architects from uselessly spending their time and money upon an undertaking which is pretty certain to bring them nothing but vexation:—"The governors require a school-room capable of accommodating 150 boys; five class-rooms, one of which is to be adapted for a governors' board-room; a bath, gymnasium, chemical laboratory, an under-cover exercise place, lavatories, &c. A dining-room to accommodate 80, with kitchen and other necessary offices, calculated to meet the requirements of the head-master also; dormitories, with cubicles, for 65 boys; also one common sitting-room and three bedrooms for assistant masters; together with suitable water-closet, lavatory, bath-rooms, &c. Matron's sitting and bedroom with wardrobe, store-rooms, &c.; two sick bedrooms, and a convalescent room, with room for nurse, water-closet, &c. A master's residence, with accommodation for his family, nursery, &c. (but not to include second kitchen). Servants' rooms for six female and two male servants; cellarage, &c., laundry, and incidental accommodation.

"Hospital (isolated) for infectious cases to accommodate 12 boys and nurses, &c., and a disinfecting chamber for clothes. Water supply must be obtained by sinking a well (60ft. to 70ft. deep), and be distributed over the buildings by means of a steam or gas engine. Effectual drainage must be provided for. It is essential that the site be inspected by any architect intending to compete. A plan of the ground, &c., will be furnished on payment of half a guinea. After full consideration of the plans, &c., the governors will decide whether they approve of one sufficiently to adopt it. Should they do so, they will award the first premium of £50 to it, and £15 to that which, in their opinion, is the next best, but they do not pledge themselves to approve of any of the plans. In case of non-approval, no premium will be paid.

"The governors anxiously desire a clear understanding to exist regarding the limitation of the cost of the building, and they therefore beg to add that no plan will be finally approved which cannot be carried out in its entirety, including all attendant expenses, architects' commission, payments to clerk of works, and all extras (with a sufficient margin for contingencies) for the sum of £6,500. This amount is to embrace all the above objects, and is to cover the total outlay. The approval of the plans will be conditional on the ability of the governors subsequently to obtain from a responsible builder tenders and contracts for the execution of the works proposed on proper specifications within the sum allotted."

From the above extracts it will be seen that it is exceedingly doubtful if any premiums at all will be awarded; as if in the opinion of the governors they do not consider any of the designs come up to their ideas, no premium will be paid. Again, to any one who knows anything about the cost of building in the present day, it is quite evident that no building, however plain, can be built with the required accommodation for the sum mentioned, as after deducting architect's commission, clerk of work's salary, and a sufficient sum to cover contingencies, there will barely be £5,500 left for the buildings themselves. I think that I have said quite enough to convince all thinking men that it would be absurd to compete under such conditions and instructions. I enclose my card, and subscribe myself—Yours, &c., One who will not Compete.

THE *BUILDING NEWS* DESIGNING CLUB VILLA COMPETITION.

Sir,—In reply to your own remarks and those of your correspondents I beg to say the cant to bay window in attic plan is intended to be carried by scantlings placed on the joists, which I think would be quite sufficient for the amount of brickwork above. The 9in. wall at side of bay would be of timber, with tile hangings. I intended the servants' w.-c. to be lighted by means of a glass riser to step at scullery door. In addition to this, the w.-c. door might be cut 6in. short at top, and so secure light and ventilation too.—I am, &c., Sin Circle.

The Dean Hook memorial clock in the campanile of Chichester Cathedral was formally started by the present dean last Saturday. The clock has been constructed by Messrs. Joyce, of Whitchurch, Salop, and is made with the compensated pendulum and gravity escapement movement invented by Sir Edmund Beckett for the Westminster Palace clock. It will strike the hours on a new 73cwt. bell, with a hammer weighing 140lb., and the Cambridge chimes will be struck quarterly on the 2nd, 3rd, 4th, and 7th bells of the ordinary peal. The clock has been fixed in the tower by Mr. W. Joyce.

In repairing the outer walls of an old house at the corner of Steep-hill and Christ's Hospital terrace, Lincoln, the removal of the upper part revealed a blocked-up ancient window, almost a fac-simile of the celebrated one in the Jew's house at the foot of Steep-hill. The central mullion was absent, and the window had been blocked up. The assumption that it was of the 12th century has been confirmed by the finding on the groining of the cellar the date 1107. The fragments of the window have been put together under the superintendence of Mr. George Bacon, of Lincoln, and through the action of the Rev. Precentor Venables, who has given a mullion-carved cap and base, and cathedral glass for glazing, the window has been opened up and preserved.

The Liskeard school board have approved sites at Dobwalls and Trewidland for new schools to be erected from the designs of Mr. Vincent.

The Baptist chapel at Corwen, Merionethshire, was reopened last week, after enlargement carried out at a cost of £500. Mr. R. Owen, of Liverpool, was the architect, and the contractors were Messrs. M. and J. Roberts, of Llangollen.

The parish church of Wellingore has been reopened, after restoration from the designs and plans of Mr. Kirk, of Sleaford. The chancel has been re-lengthened, the roofs of both chancel and nave raised to a higher pitch, the floor of nave lowered to original level, and the number of sittings increased from 164 to 209. The cost has been £1,600. Messrs. Knight and Maxey were the contractors.

Messrs. Hodson, Price and Hodson, of Loughborough, have been appointed architects for the erection of new schools for the School Board of Loughborough.

A new pulpit and lectern of cedar and oak were uncovered last Sunday in St. Swithin's Church, Sandford, Devon. The lectern was designed by Messrs. Innocent and Brown, of Sheffield, and both were carved by Mr. H. Hems, of Exeter.

The clock which is now fixed in the Guildhall, Totnes, has been manufactured and fixed up by Messrs. Gillett, Bland, and Co., of Croydon. The bell was also cast in Messrs. Gillett, Bland, and Co.'s bell-foundry.

The Artizans' Dwellings Improvement Act, 1875, is about to be applied by the Derby Town Council to an unhealthy area in that town, comprising parts of St. Helen's, Goodwin, and Jury streets, Walker and Bold lanes, and Willow-row.

Intercommunication.

QUESTIONS.

[5581.]—**Repairs.**—Is it usual for the landlord or tenant to repair glass broken in a large skylight over ground floor? There is a walk round the skylight, forming a lead flat, which is constantly used by the tenant.—A Subscriber.

[5582.]—**Ecclesiastical Dilapidations.**—I am concerned in a survey under the Ecclesiastical Dilapidations Act, 1871, and should be much indebted to any of your readers who would refer me to some work setting out what comes under the cognisance of the diocesan surveyor as regards chancel dilapidations—*e.g.*, I have been informed (but I should have felt disposed to doubt it) that the repair of the windows and flooring of a chancel is the duty of the parish—not of the rector or vicar; so too with the rails in front of the communion table, and also the stairs leading to the pulpit when the latter is entered from the chancel. This seems probable enough. All I have at present to guide me are the rubrics and canons, which do not give sufficient information.—S.

[5583.]—**Gothic Roof.**—I should be obliged if some of your readers would kindly inform me where I can obtain information as to the construction of open roofs for Gothic buildings, such as chapels, &c., roofed in one span? I have many books, but can obtain no satisfactory information as to designing, size of timber for, strength, &c., of the above, although I have every information of the ordinary king and queen-post roofs, with tie-beam at foot of principal rafters; but I wish to place it about half-way up, so as to give greater height to chapel.—Young Architect.

[5584.]—**Foundations.**—What is the best way to support a stone building on land which is composed chiefly of wet soft bog, from 10ft. to 15ft. in depth, on a chalk bottom? Would not piles rot in the course of time?—Inexperience.

[5585.]—**Wood Paving for Churches.**—Will some of your readers kindly inform me on the following points relating to wood block pavings for churches or schools:—1. What kind of fir is most suitable for the purpose? 2. What kind of bed is best for the blocks to be laid upon? 3. How wide and how thick should the blocks be? 4. Is there any objection to laying the blocks endways of the grain? 5. What is about the cheapest rate per yard super that such pavings can be laid, including the bedding upon which the blocks rest?—S. P. G. R.

[5586.]—**Pump for Boiling Water.**—May I ask if there is a small hand pump made that can be relied on if used to pump boiling water?—Q.

[5587.]—**Dross from Galvanising.**—Will some one kindly inform me how to manipulate the metal dross from a galvanising pot so as to enable me to use it again? I believe there is a way. If not, what is the best use to which it can be put?—H. C. Waters.

[5588.]—**Hair in Plaster.**—For what length of time will hair remain intact in plastering? Is it ever known to have been destroyed by the chemical action of the lime, or from being mixed with the lime and lying damp for a considerable time before being used?—Alpha.

[5589.]—**Lead and Wire Gauge.**—I have to thank E. F. Dawson for his kind answer to my question on this subject; but there seems to be an inaccuracy in the No. of gauge given for 4lb. lead. Will he kindly inform me if that is so, or if No. 18 is correct?—H. G. B.

[5590.]—**Glazed Drain Pipes.**—Will some kind reader inform me what is the difference between a stoneware and an earthenware drain-pipe, and what is the best and most practical mode of testing a drain-pipe as to its strength and durability?—A. B. C.

[5591.]—**Cement Blackboard.**—What is the best way of blackening a cement blackboard—by mixing colouring matter with the cement, or by painting, or how?—J. A. G.

REPLIES.

[5514.]—**Damp Walls.**—Mr. T. Blashill will excuse me if I have misunderstood him, but his statements were intended to show that after all a hollow wall may be as absorbent as a solid one. This idea I dispute if the hollow wall is properly constructed. If he calls this a "careless statement" I may well retort, but I prefer with him to examine facts. I dare say—without the slightest discourtesy—I have erected more hollow walls than Mr. Blashill, at least I ought to know something about them. Mr. Blashill says, "What I dispute is that a well-built wall of the thickness of 14in. and upwards will allow rain to soak through the bricks and pour down inside." Now, as I have asserted, I know of similar cases to that given by "Architect," in which neither the junction of wall and roof, nor other means of transmission mentioned by Mr. Blashill, existed. But my explanation of the evil is rather different to that given by him. Mr. Blashill asks, "Why in a fence wall that is exposed to driving rain the water does not run through and pour down the sheltered side, as it is said to do in houses." It is readily explained by the fact that moisture is absorbed

towards the warm side, and that the heat of a room will often draw the wet inwards. A fire will do this. As Mr. Blashill wants facts this is one he may prove for himself.—G. H. G.

[5551.]—**Valuer's Licence.**—I am obliged to "G. H. G.," "Lex," and others for their replies to my query. Many architects insert in the contracts some such clause as the following: "And all extras or omissions shall be valued by the architect, whose decision shall be final and without appeal." It now appears from the replies of "G. H. G." and "Lex," that architects who insert such a clause must both stamp their certificates, and hold a valuer's licence. If a valuation which binds two parties requires to be stamped, should not all architects' certificates be stamped?—J. P. O.

[5568.]—**Boarding-up Windows.**—"Darkness," I fear, has no remedy. The mutual understanding would not hold valid under the circumstances in law. "Darkness" can, however, sue B for any injury in conducting damp. The better plan would be to come to terms about the light.—SURVEYOR.

[5569.]—**Salt Stains in Bricks.**—The only remedy I have ever found for the above troublesome disfigurement or for the equally troublesome sea-salt in sand used for mortar, is the "enamel paint," prepared by the Silicate Paint Company, of Liverpool, and now extensively used for the interior of salt-carrying ships to protect the iron, instead of "cementing," which has heretofore been so costly a necessity. No other paint will stand the action of salt, but to prove that this enamel paint is unaffected by the strongest brine, the Silicate Paint Company, of Liverpool, showed at the Paris Exhibition an iron keg painted inside with one coat of this "enamel paint" two years ago, and which has ever since been kept filled with wet salt without the slightest injury to the paint, whereas the outside of the keg, painted at same time with ordinary lead paint, is one mass of red rust.—A SHIP PAINTER.

[5570.]—**Temporary Conservatory.**—It has been decided that a conservatory placed on brick footings becomes a parcel of the freehold, and cannot be removed, but I should recommend "Temporary Conservatory" to obtain the consent of the landlord to the erection, giving him a month's notice before removing the same at the expiration of the tenancy. A boarded floor could be more readily removed than one of asphalte.—G. H. G.

[5575.]—**Solid Content of Hollow Column.**—Multiply the sum of the two diameters by their difference and the product by ·7854. This will give the area of the circular ring included between the external and internal diameters, and this product by the height will give the solid content. Taking the case of your correspondent "Rex," (8 + 6) × (8 − 6) × ·7854 × 30 = 659·736, the solid content in cubic feet. This rule depends on that for finding the solid content of a cylinder by multiplying the area of the end by the height. The end being a circle the area = diameter × ·7854, and the area of a concentric ring = difference of the squares of the diameters × ·7854, which is the same as the product of the sum and difference of the diameters × ·7854.—J. L.

[5575.]—**Solid Content of Hollow Column.**—Supposing the column does not taper the area is obtained in this way:—Multiply the sum of the diameters of the inner and outer sides by their difference and by ·7854, and multiply this product by the length, or 30ft. Thus, 8 + 6 × 2 = 28, and 28 × ·7854 × 30 = 659·7360 cubic feet in the column.—G. H. G.

[5575.]—**Solid Content of Hollow Column.**—Find the area of the outer and inner circles separately by multiplying the square of the diameter by ·7854. Subtract the lesser from the greater area, and the remainder, multiplied by the length of column = the cubic content of the solid.—JAS.

[5577.]—**Railway Compensations — Lands Clauses Acts.**—If "Lex" will consider the matter he will see that he is not correct in his premises, for any house agent in the locality would collect the rents of the two houses on the usual terms, and therefore the cost of collection would be reduced proportionately. Again, as to law costs, these would be reduced, for the Incorporated Law Society's charges are based on the amount of purchase money, and their scale would necessarily govern in a contested matter of this kind. Therefore "Lex" had not made any case of injury by severance. As to his second question, supposing both arbitrators appointed, can either or both proceed *ex parte?* the answer is "No," and the same reply to his further question, Does the arbitration fall through? The course of procedure is, if the arbitrators cannot agree or will not proceed then the umpire acts, and his decision is binding on all parties to the reference.—BANISTER FLETCHER.

[5578.]—**Creosoting Timber.**—In reply to "T. M.'s" inquiry respecting the above I think he will do well to adopt the creosoting process to his oak posts for the fence. From the following remarks he will gather whether it is advantageous or not. Various remedies have from time to time been proposed, but the plan which has come into most general use for submarine and outdoor purposes is that of saturating the timber with creosote or oil of tar to prevent the rapid decomposition of timber and its predisposition to premature decay. One hundred parts of coal tar contain, when submitted to distillation, 65 parts of pitch, 20 of essential oil (creosote), 10 of naphtha, and 5 of ammonia. The preservative properties of this material (creosote) appear to be threefold:—1st, it prevents the absorption of moisture in any form, or under any change of temperature; 2nd, it is noxious to animal and vegetable life, thereby repelling the attacks of insects, and preventing the propagation of fungi; 3rd, it arrests the vegetation or living principle of the tree, which continues for a time after its separation from root, and which is one of the primary causes of dry rot and other species of decay. Creosote is at present used for the preservation of timber, either under pressure in strong closed cylinders, or by placing the timber in open tanks and keeping the solution up to a temperature of 120° to 150° until the required quantity is absorbed. The former process is by far the most general, being so much more effectual and expeditious, and in the best creosoting works the oil is injected at a temperature of 120° under a pressure of 150lb. on the square inch, so that ordinary fir timber absorbs, on an average, from 8lb. to 10lb. weight of creosote to the cubic foot. Fir timber thus prepared is far more durable than the best unprepared oak, teak, or other hard woods, and the cost is small. I should imagine, therefore, from this fact, that "T. M." could make fir timber do for his posts if he resorts to the plan of creosoting, without getting oak, unless he specially desires to do so. Long experience has proved that the injection of creosote is an effectual protection against the most inveterate timber-destroying insects, even the teredo in water and the white ant on land, both of which are the most destructive of their kind. Creosote is highly antiseptic, and combines with acids and with alkalis, but it is decomposed by strong nitric and sulphuric acid.—JOHN ADAMS.

[5580.]—**Architects' Charges.**—I will endeavour to reply to "Provincial S.'s" questions seriatim:—1. The custom is to charge 5 per cent. on the total cost of materials and labour by whomsoever supplied, as the architect's design is supposed to include everything necessary. 2. Certainly not. 3. No. 4. An architect can charge on lowest estimate for anything he obtains. 5. No. 6. Certainly not. 7. Architect can charge his commission on old grates, chimney-pieces, &c., used in building. 8. Yes, an extra charge is generally made for time and expenses. —G. H. G.

[5580.]—**Architect's Charges.**—"Provincial S." would do well to send 3d. to the librarian, R.I.B.A., and obtain the authorised scale. It explains the duties to be performed, as well as the charges to be made. The prejudicial effect of a dispute, which is almost independent of its merits, would often be avoided by this means, especially if temperately applied. Taking the queries in the order given, but not verbatim, it may be said:—1. Charge 5 per cent. on amount of contract and extras, including (at builder's prices) things provided by employer. Deduct 2½ per cent. on omissions. 2. Separate payments by client would not annul the claim to commission. 3. Client is wrong. 4. Apply the foregoing rules. 5. Commission is not to be charged on salary of clerk of the works. 6. Architect must deposit in his (the C. W.'s) charge the requisite drawings and specification, but the bill of quantities can only be necessary under special circumstances. Stationery for the architect's purposes should be supplied by him. 7. In every respect, except their setting, there seems to have been a reservation in favour of the client's "old grates, chimney-pieces, and boilers." They were neither specified nor estimated, though "thought out and shown on the drawings." But to think out old grates must be superfluous, and their character supplemental rather than integral; so that I should here draw the line in the client's favour. 8. The earliest steps should have direct tendency to a successful end, and first of all should be that attentive examination of the site and its aspects commonly called a survey. This, together with other preliminary work, such as sketches and approximate idea of cost, is included in the 5 per cent. "Obtaining the necessary and complete particulars of a ruin and its details" has quite an extraneous appearance; but when a long journey by rail, attended by artisans and labourers in addition to the office staff, is involved, there surely ought to be a preliminary understanding with the client on the question of expense! The time, railway fares, and other costs of such an excursion might alone account for "the recent action of a client who has gone in for some wholesale deductions from a professional account" Discard at once the "legal" view; make reasonable abatement, and keep your client.—CONCILIATOR.

The Board Schools at Mold are about to be enlarged, from the designs of Mr. Aydon, of that town, at a cost of about £500.

The chancel of Charlton King's parish church, was reopened on the 7th inst. after complete restoration. The architect was Mr. Middleton.

Memorial stones have been laid of a Wesleyan chapel at Teddington. The chapel will stand at the junction of five roads, and will cost £3,200, including £400 for site. Messrs. T. and W. Hickinbotham are the builders.

The memorial stones of a new Wesleyan chapel have been laid at Upper Tooting. The edifice is being erected from the designs of Mr. Pocock, at a cost of £6,000.

Our Office Table.

THE election of Mr. Leighton as the new president of the Royal Academy is in every way a satisfactory one. The confirmation of the election, and the acceptance of the office, will probably follow as a matter of course. All would regret any imitation on the part of the new president of the conduct of Sir Edwin Landseer, who, when chosen on the occasion of the last vacancy, declined to serve. Mr. Leighton will be the first president since the death of Sir Joshua Reynolds in whom every academician can honestly recognise a superior, and that is a good deal to say when the mediocrities who have been elected during the present century are remembered. The ordinary duties of the office of president will doubtless be as well discharged in the future as they have been in the past, but true artists look for higher qualifications in their accredited representative and mouthpiece to the world, and they will not look to Mr. Leighton for these in vain.

THE Bishop of Truro wishes the following particulars to be published with regard to the new cathedral to be erected for his diocese:—"The architect, Mr. J. L. Pearson, A.R.A., has not yet been able to furnish an estimate. The site will allow of a church 270ft. long and 72ft. wide. It is not proposed to build in the first instance more than the choir and transept. The ancient work will be preserved. A sum of £27,600 has been raised in a few months, of which at least £5,000 will have to be spent on ground. No one imagines that the choir and transept of a worthy cathedral, however simple in style, can be built for this sum. The new nave of Bristol Cathedral is in superficial area equal to what the nave of Truro would be. It is said to cost, with the bases of two western towers, £60,000. Edinburgh nave and choir (if I am not mistaken) costs above £100,000* without towers. Again, the distinguished artist who will work for us has built one of the noblest of modern churches—St. Augustine's, Kilburn. Compared with that our first section of work would be as three to two in area, and and should be as five to three in height. The carcase of that, in brick, cost £15,000 without tower. All would condemn us of inadequacy if we started to build for £20,000. We should condemn ourselves if we started to build on a scale twice as great as we could hope to afford. We believe, then, that Englishmen and Englishwomen will help us far and wide. Registers of remote parishes in Cornwall record what sums they contributed two centuries ago to the erection of St. Paul's for London. And they who were not too remote to help the splendour of that great rebuilding are not too remote to be helped in modestly yet boldly founding theirs, the first cathedral attempted since."

A KONIGSBERG agricultural journal publishes particulars of an inexpensive process by which the dampness of walls may be effectually cured. The wall or damp portion of it, whether of brick or stone work, must be stripped of all plaster, &c., that may be on it, and the exposed surface well brushed with a stiff, worn-down besom. A hundredweight of common tar is then heated in a pot with 3½lb. of hog's fat, and when this has quite melted, 8lb. of fine brick dust is gradually added to the mixture, and the whole stirred round with a stick till no solid lumps are left in it. The fire is then slackened, and only just sufficient heat kept up under the pot to maintain its contents slightly warm and thoroughly fluid. The mixture is then quickly and freely applied to the surface of the wall, and dry drift sand thrown upon it before it has time to dry. Great care

* This statement, as Mr. J. O. Scott has pointed out, is misleading. It requires correction, both because it has a bearing on the Bishop's argument, and because it is certainly desirable that facts connected with its erection should be correctly known. The cost of St. Mary's Cathedral, Edinburgh, will be a little over £100,000. The church will be quite complete, with the exception of the upper part of the two western towers and the chapter-house; but the great central steeple, some 44ft. in diameter, and 280ft. in height, is included, and will shortly be finished; as well as all sculpture, the internal fittings, such as stalls, bishop's throne, pulpit, &c., the screens only being postponed. So that, considering the magnitude of the building, some 262ft. long and 133ft. broad across the transepts, as well as its very stately character, its cost is by no means high.

must be taken that no part of the surface is left untreated, for in such places the damp will invariably penetrate anew. When this coating is perfectly dry the wall may be plastered over in the ordinary manner. The quantities of material above indicated will suffice for the treatment of about thirty square metres of wall-surface.

THE trade year in the Potteries, which has just closed, has been more unsatisfactory than any year since the Crimean War, and at the present time, though in special branches of the trade men are working nearly full time, not more than half the producing power of the district is in operation. The declared value of the goods exported in the first nine months of 1878 was £1,260,590 against £1,288,777 in 1877, and £1,270,606 in 1876. The value of the goods shipped for the United States in the same period was only £414,404, against £454,353 in 1877, and £425,806 in 1876. The orders received from America have fluctuated month by month, and the value of the goods shipped in September dropped down to £36,000, which was little more than half the value of the business done in some of the other months. There has been an increase of business with British North America, while the orders from Brazil and all the other parts of South America have been scarce throughout the year. The goods made for the French market show a considerable improvement in value to those of previous years, but this is in no degree attributable to the exhibition, which has been productive of very few orders for this district up to the present time. Germany has purchased less British pottery this year than usual. In Italy, Holland, and Spain there has been an improved demand which in some measure compensates for the falling off in Germany and America, but from India and Australia fewer orders have been received. The home trade is extremely unsatisfactory, and travellers report an increasing difficulty in obtaining orders or the settlement of accounts.

THE Camberwell guardians have had some misunderstanding with the architects of their new infirmary in Gordon-road (Messrs. Berriman and Son) as to the erection of a large tank for rainwater. At the meeting of the guardians on Wednesday week a letter was read from the architects, replying to the question by what authority the tank had been proceeded with, it that was commenced as far back as the 14th January, and practically by the instructions of the board. The Rev. A. Drew characterised the latter statement as incorrect, and said, even supposing the alterations committee had sanctioned the work, the architect knew they had no actual power. The action of the architect was criticised by several members of the board, Mr. E. Dresser Rogers saying that he had hoped, seeing that the architect selected was a local man, that that gentleman would have endeavoured to assist the board in carrying out the work in the most economical manner possible, but instead of this they found the opposite. The following resolutions were passed:—"That in the opinion of this board it was the duty of the architect, when the board arrived at the decision to utilise the rain-water, to forward plans or a statement, showing, in his opinion, the best means of so doing, and submitting the same for the consideration of the board;" "That Mr. Berriman be instructed to suspend all further work in connection with the rain-water tank until he shall have submitted the plans and exact estimate of the cost, and obtained the sanction of the board." It transpired in the discussion that the members of the board have been divided in opinion as to the best mode of utilising the rain-water, and that the method adopted has not yet been sanctioned by the Local Government Board. The incident suggests the possibility of unpleasant remarks being publicly made concerning an architect if he acts upon instructions given informally by a committee of the body by whom he is employed, especially if the members stand in jeopardy of being personally surcharged by the Local Government Board's auditor.

THE Liverpool Engineering Society held its usual fortnightly meeting on Wednesday evening, November 6th, at the Royal Institution, Colquhitt-street; the President, Mr. Robinson Souttar, in the chair. Mr. George Biddle read a very practical paper on "The Materials, Cost, and Construction of Roads." The author, while dealing with various forms of street pavement, directed the attention of the members chiefly to the consideration of macadamised and sett-paved roads. In deciding as to the material and form of construction to be adopted many things had to be taken into consideration—not only the first cost of the material and labour in laying the road, but also the subsequent cost of maintenance and scavenging. The latter of these items formed a very important element in the cost of a street. Impervious pavements were being much used in many large towns at present, and were giving most satisfactory results, though the theory that they were best was open to question. It was found that granite pavement lasted the longest of any—20 years being the life of a first-class impervious sett pavement. As regards the comparative safety of granite and wood, it has been found from actual observation that a horse can travel without falling three times as far on the latter as on the former. An interesting and animated discussion followed the reading of the paper, and the meeting concluded with a cordial vote of thanks to the author.

A NEW bridge, which during the past year or two has been in course of construction over the river Irwell, was opened last week. The bridge is formed of wrought-iron girders, resting at the ends on ashlar stone abutments, and when viewed from one side its shape resembles that of a bow and string, with the curved part uppermost, and the intervening space filled with lattice work. It crosses the river diagonally at a height of 23ft. above the ordinary level of the water, and rises in the centre to a height of 18ft. above the roadway which it carries. Including the two longitudinal girders, which have a span of 140ft., there are 39 girders in the structure—the total weight of the ironwork being nearly 1,000 tons. The roadway measures 60ft. across, including two footpaths, each 12ft. in width. On the Salford side an inclined roadway about a quarter of a mile long has been constructed, the height of which at its junction with the bridge is 18ft. above the level of the adjoining land; while on the Old Trafford side a level road, nearly 250 yards in length, has been formed. The contractors for the undertaking are Messrs. E. T. Bellhouse and Co., Manchester, from whose foundries the ironwork has come: and under them Messrs. A. Pilling and Sons, Bolton, have done the masonry and brickwork of the bridge, roads, and boundary walls.

THE English correspondent of our American contemporary, the *American Architect and Building News*, has been describing Mr. Burges's house at Holland Park. Speaking of the library, he says it is "a symphony in gold. One-third the height of the room is taken up by a frieze of the deepest gold, a scroll pattern picked out with red." He also describes the library mantel, with its frieze of figures representing the parts of speech before the Tower of Babel, driven back by a figure of grammar. Again, we are told, "in the architect's bedroom there is such a flood of colour that the ground of the furniture is scarlet without its appearing too crude. Instead of shutters delicate gilded lattices, of Eastern design, close the windows, and the red marble basin is inlaid with silver fishes. It is this endless play of fancy and his fastidious taste which have, perhaps, kept Mr. Burges from competing more frequently for important buildings." Of Mr. Whistler's house, at Chelsea, designed by Mr. Godwin, the writer says "the first design was so plain and ugly that the Metropolitan Board refused to grant a licence for it. It was then ameliorated enough to pass that most tolerant of critics. Its small front door opens directly on a landing of the staircase—an excellent way to break the necks of burglars, and of all who are not forewarned that their first step from the door will precipitate them headlong into the large atelier below."

THE Glasgow Institute of Architects have intimated a number of objections to the proposed provisional order by the Glasgow Police Board for the regulation of buildings. They object, first, to any alteration of the Police Act in this direction, because they are unanimously of opinion that the question can only be satisfactorily dealt with by a comprehensive Building Act, clearly defining what may be justly demanded for the public good, and so altering the constitution as well as the jurisdiction of the Dean of Guild Court as to afford some reasonable assurance that its efficiency, or, what they would prefer, transferring its functions to a new and proper judicial court; and on the general ground that the alterations proposed are in most points deficient in pre-

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cision, leaving matters of great importance to the discretion of the master of works for the time being. In particular they object to the clause making the ceilings not less than 10ft. high, because it is unnecessary, and would interfere with the price of ground by restricting the number of dwellings which might, with all proper regard to hygienic requirements, be erected on it; that the specified widths of passages and stairs would in many cases be excessive; and to the "depth of the foundation," because it would be impracticable. They are of opinion that the words "exclusively belonging to and connected with the land or heritage in which each such apartment is situated," ought to be deleted. They approve of the alterations in the relative position of tenements intended to be secured by this clause, but they strongly condemn any attempt to gain such ends by confiscation. The objections stated were to be laid before Sheriff Clark yesterday.

Prof. Hirm has published a memoir on the present condition of the Cologne Cathedral, which contains some alarming statements. The building is threatened, according to the professor, with no very remote ruin. Solid as the stone appears, which was quarried from the famous Drachenfels, in the district of the Seven Mountains, and was employed almost exclusively in the earlier stages of the building, it rapidly becomes a prey to atmospheric ravages, and turns soft and earthy. In the oldest part, especially at the foot of the southern tower, the cornices, mouldings, and fillets (*verticalleisten*) are so utterly destroyed that the original profile is no longer recognisable. The larger square stones, which are being withdrawn in the process of restoration, fall into crumbs at the lightest stroke of the hammer. At the present moment the experts fear that during a thorough examination of the interior of the cathedral they may be brought face to face with the deplorable fact that the insidious process of decomposition is going on in the buttresses and elsewhere, and they recoil from recourse to a series of unsightly and disfiguring repairs.

Mr. Gladstone, in his very able remarks on "Culture," at Buckley last Monday, speaking of labour, said that "machine labour tends naturally in a certain degree to make the man himself a machine," and in furniture and house-building a demand for originality and individuality of handwork is beginning to make itself felt. People tire of things which are precisely like those possessed by millions of their contemporaries, and are glad to pay for novelty. Indeed it may be shown that machine labour is helping the working man by giving him more leisure for cultivation—if it does also take the place of mind in some instances. Mr. Gladstone has more than any other man, save perhaps Ruskin, done a noble work in his day in trying to lift handicraft above the contemptuous sneer of the weak-minded. He has shown that every kind of labour may be ennobled by the alliance of mind and hand, and that real culture may be obtained in other ways than by the acquisition of mere book-learning. Such an institution as the new City and Guilds Institute for Technical Education ought to do much for this kind of culture.

An exhibition of transparent tableaux from Berlin is now on view at the Westminster Aquarium. The pictures are each 12ft. by 14ft., are painted on canvas in thin colours, and are shown in a darkened room by a series of lights behind. They are, however, of a higher class of art than the panoramas with which this device is familiarly associated, and comprise half a dozen Scriptural subjects by the following German artists—Prof. Eschke, Bennewitz von Loeffen, Prof. Hübner, Körner, Sturm, and Zöpke. The treatment is in each case fresh, and several of the pictures display a smoothness of manipulation and skilful management of light and shade rarely noticeable in works of so large a scale. In Von Loeffen's "Moses descending from Mount Sinai" the patriarch is standing upon a ledge of the holy mount, with the stone tables in his hand. His face is yet radiant with Divine light, and above his forehead quivers the conventional lambent horn-like flames. Below is seen the plain and some of the tents of Israel. The mode in which any necessity for an attempt to portray the Divine Presence is evaded by representing Moses on a rocky terrace, above which the mountain side looms to the verge of the picture, is worthy of high commendation. "Noah's Ark" is comparatively tame, and, moreover, shows the unwieldy vessel, not on a calm expanse of boundless flood, but as tempest tost just off a lee shore of formidable cliffs and rocks. "The Adoration of the Wise Men" is worthy of study, but is very unequal in execution; the expressions in the faces of the Magi and the barbaric rudeness of their garments contrast with the doll-like Holy Child. In the "Flight into Egypt" Herr Körner shows accurate perception of and skill in reproducing the Egyptian architectonic forms. "The Ascension of Christ," by Zöpke, is based on mediæval precedent as to pose and clothing; the colouring is harmonious, but a grave defect is that the expression on the face of the rising Saviour is mediatorial, and not, as the subject demands, victorious. It is stated that the paintings have not been exhibited elsewhere, excepting at the Royal Academy of Berlin.

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MEETINGS FOR THE ENSUING WEEK.

Monday.—Royal Institute of British Architects, 8 p.m.

Tuesday.—Institution of Civil Engineers. Discussion upon Papers on "The Avonmouth Dock," "The Belfast Harbour," and "The Whitehaven Harbour and Docks," 8 p.m.

Wednesday. British Archæological Association. Papers on "Welbourne and its Locality," by Rev. S. M. Mead, V.P., and "Roman Monument from Bremenium with Syriac Inscription," by Thos. Blair, 8 p.m.

Friday.—Architectural Association. Paper by Aston Webb, V.P., on "Windows," 7 30 p.m.

CHIPS.

A new school-room and house in connection with the English Congregational Church at Mold were opened on Tuesday week. They were built by Mr. Richard Roberts, of Mold, under the superintendence of Mr. Aydon, of Mold, from a design furnished by Mr. T. A. Murray, of Liverpool. The outlay has been £1,800.

While commencing the works of restoration at Sutton St James's parish church, for which he is contractor, Mr. Robert Carbutt, jun., builder, of Long Sutton, fell from the scaffolding one day last week, sustaining a fractured leg and severe injuries to the head.

The Dawlish Local Board on the 7th inst., completed the purchase of 17 acres and grounds for £22,500, as a public recreation ground. At the same meeting it was determined to carry out a scheme of water supply as proposed by the surveyor, subject to modifications suggested by Mr Appleton, C.E., of Torquay, who had been requested to report thereon.

The Local Board of Caerleon, Monmouthshire, considered on Tuesday week plans and sections for the drainage of the town, prepared by Mr. Warren, C.E., Newport. They were eventually adopted, and Mr. Warren was appointed engineer at a remuneration of 5 per cent. upon outlay.

We understand that the Junior Carlton Club, which has been closed during the past two months for repairs and embellishment on an extensive scale, has, in addition to other improvements, been ventilated by the Sanitary Engineering and Ventilation Company, of Westminster. The arrangements, which consist of a complete system of inlet and efflux, are such as to ensure a constant and gentle circulation of air in each room, without draughts, and without introducing those particles of dust and dirt which are always more or less present in the atmosphere of crowded cities.

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Trade News.

WAGES MOVEMENT.

ABERDEEN. — At a meeting of the Aberdeen Master Masons' Association, held last week, it was unanimously resolved, in consequence of the continued depressed trade, to reduce the standard rate of wages to 6d. per hour on and after 8th February next.

CRIEFF.—The master joiners of Crieff have again reduced the wages of the operatives ½d. per hour, the rate now paid being 6d. per hour.

DALSERF, N.B.—Owing to the extreme depression in the building trade the quarries in this district are being closed, and there appears little sign of speedy improvement.

GLASGOW.—The Glasgow masons, who number about 1,500, struck work on Monday against a proposed reduction of their wages from 8d. to 7d. an hour. As an indication of the present state of the building trade, not only has the number of masons been reduced to less than one-half of what it was two years ago, but a great many houses are standing empty. The employers have stated in the most distinct manner that it is impossible for them, under existing circumstances, to accept any compromise. The Partick masons, to the number of about 200, have also struck work against the reduction of 1d. per hour. A considerable number of the masters offered "to split the difference" by giving 7½d., but this was not accepted by the men.

GREENOCK.—The operative masons in Greenock have received notice of a general reduction of ½d. per hour. The men have agreed. The wages will now be 8d. per hour.

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These SLATES are of a grey-green tint, are stout, and made in all sizes. A large stock available for immediate delivery. For further particulars (with a list of important buildings covered) apply to the MANAGER, Clynderwen, R.S.O., Carmarthenshire.—[ADVT.]

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CHARLES TRASK,
Norton-sub-Hamdon, Ilminster,
Somerset.—[ADVT.]

TENDERS.

BLACKBURN.—For the erection of boundary walls, iron railing, gates, hot water heating apparatus, and hot water apparatus for tea meetings, for the Wesleyan-Methodist Chapel, Preston-road, Blackburn. Mr. William S. Varley, architect, Blackburn:—

Boundary walls:

Lewis	£530	0	0
Arkwright Bros.*	482	10	8

[Afterwards reduced to £432 12s. 9d. and accepted.]

Railing and gate:

Mercer Bros.	62	10	0
Barton and Son (accepted)	60	0	0

Heating apparatus:

Exors. of John Baldwin...	265	0	0
Barton and Son	193	0	0
Varley and Son	190	0	0
Mercer Bros. (accepted)...	155	0	0

Hot water apparatus for tea meetings:

Mercer Bros. (accepted)	42	10	0
Barton and Son	37	10	0
Varley and Son	35	10	0

BOGNOR.—For road and sewer works for the Bognor Local Board. Mr. H. Stringfellow, town surveyor:—

Harrison	£2,490	7	0
Marshall	2,400	0	0
Hayter (accepted)	2,326	2	2

DORKING.—For house for E. Waterhouse, Esq., Felday, near Dorking, Surrey. Mr. G. T. Redmayne, architect, Manchester; quantities supplied:—

Mitchell, E. J. and W...	£5,802		
Laxells, W. H.	5,680		
Downs, W., and Co.	4,990		
Stepheus and Bastow	4,948		
Colls and Son	4,890		
Wall and Hook	4,600		

EAST GREENWICH.—For erecting cart lodges and offices on the Board's premises at East Greenwich, for the Greenwich District Board of Works:—

Etheridge	£813	0	0
Lee and Son	803	0	0
Cooke	780	0	0
Keefe	770	15	10
Good and Winder...	750	0	0
Garlick and Cain	745	0	0
Mace...	669	13	0
Warr...	659	0	0
Eady...	640	0	0
Sim, of Windsor (accepted)	631	0	0

EPSOM.—For a house, office, and boundary wall, for William Reader, Esq. Mr. Hatchard Smith, architect, 44, Ebury-street, Chester-square, and Epsom:—

Hooker (accepted)	£2,250		

WAKEFIELD.—For enlarging the Wesleyan Sunday Schools, Eastmoor, Wakefield. Mr. William Watson, architect:—

Flower Bros.	£477	0	0
Gibson	412	10	0
Tattersall	389	19	0
Young	349	4	0
Swift and Hodgson	346	10	0
Guest and Craven...	342	8	0
Webster	341	15	0
Summers Bros.	320	10	0
Bagnall Bros. (accepted)	308	16	0

GREAT HARWOOD.—For the erection of office, boardroom, and dwelling-house for the Local Board, Great Harwood. Mr. William S. Varley, architect, Blackburn; quantities supplied:—

Clegg, Accrington	£780		
Ramsbottom and Son, Accrington	754		
Grimshaw, Church	745		
Lewis and Son, Blackburn	698		
Wolstenholme, Rishton (accepted)	640		

HAMMERWOOD.—For a new district church at Hammerwood, East Grinstead, for Oswald Smith, Esq. Mr. E. P. Loftus Brock, architect:—

Brass	£5,100	0	0
Runnacles	4,953	10	0
Shearburn	4,600	0	0
Bowman and Scowen	4,400	0	0
Godley	4,280	0	0
Nightingale Bros. (accepted)	4,220	0	0

HOXTON.—For the enlargement of the Hamond-square School, Hoxton, by 400 places, for the London School Board. Mr. E. R. Robson, architect:—

Browne and Robinson...	£4,843		
Jerrard, S. J.	4,799		
Perry and Co.	4,789		
Roberts, L. H. and R....	4,785		
Higgs and Hill	4,784		
Grover, J.	4,737		
Boyce, T....	4,690		
Pritchard, G. S. (accepted)	4,579		

[Cost per head of enlargement only, £11 8s. 11d.; cost per head of complete school, £7 19s. 10d.]

HOXTON.—For alterations and additions to Hoxton House. Mr. C. H. Howell, architect:—

Brass	£4,479		
Greenwood	4,272		
Brown and Robinson	4,270		
Pritchard	4,171		
Ashby Bros.	4,100		
Higgs and Hill	4,080		

PENGE, S.E.—For a clock for the new vestry hall at Penge:—

	With gravity		escapement.
Barraud and Lunds, Cornhill ...	£57	10	6
Thwaites and Reed, Clerkenwell	58	0	0
Gillett and Bland, Croydon ...	55	0	0
Smith & Sons, Clerkenwell (acc.)	50	0	0

PLYMOUTH.—For building stables in Higher-lane for Mr. Hoare. Mr. J. H. Keats, architect:—

McMillan, H. B.	£584	0	0
Berry, J. P.	540	0	0
Trelaven	526	14	0
Steer...	490	0	0
Lethbridge, A.	487	10	0
Bishop and Son	448	10	0
Palk and Partridge	420	0	0

SANDAL.—For conservatories at Castle Lodge, Sandal, near Wakefield. Mr. William Watson, architect:—

Accepted tenders:

Bagnall Bros. (excavating, brick, and stone)	£144	0	0
Guest & Craven (carpenter & joiner)...	169	18	6
Woodhead, W. (plumbing & glazing)	70	0	0
Kirk, J., and Co. (hot water and engineer's work)	135	12	6
Naylor, Thomas (painting)	22	10	0

SCARBOROUGH.—For heating with hot water Wesleyan Sunday Schools, Queen-street, Scarborough. Mr. William Watson, architect, Wakefield:—

Redfern	£95	0	0
Barratt and Leggott	88	10	0
Blakeborough	86	0	0
Seward	82	0	0
Whittaker Bros.	81	0	0
Hearn and Co. (accepted)	79	10	0
Heaps and Robinson	69	10	0

TUNBRIDGE WELLS.—For the completion of three unfinished houses in Woodbury-park for The Tunbridge Wells Freehold Land and Benefit Building Society. Mr. W. Hopper, surveyor. Chimney pieces and kitcheners not included:—

Beeching	£1,990	0	0
Stephens	1,950	0	0
Judd and Young	1,945	0	0
Willicome and Oakley...	1,903	0	0
Elwig	1,897	0	0
Brewer	1,713	14	0
Ovenden	1,698	7	6
Thorogood	1,544	0	0
Stott (accepted)...	1,522	18	8

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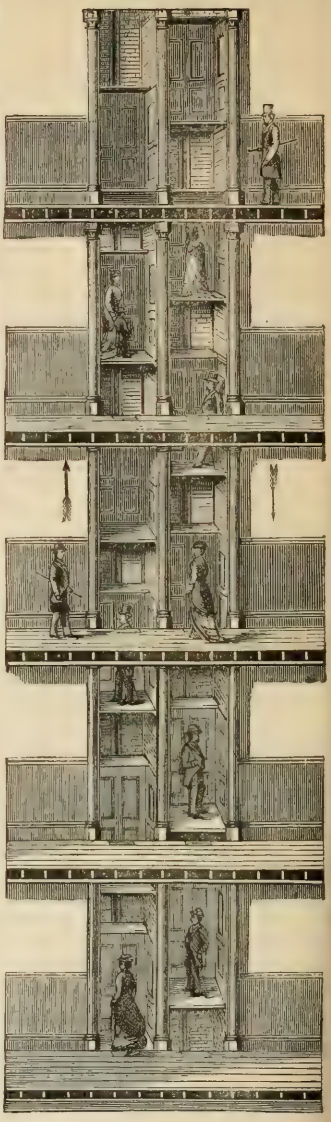

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THE BUILDING NEWS.

LONDON, FRIDAY, NOVEMBER 22, 1878.

A CATHEDRAL FOR SOUTHWARK.

WE have nothing to do here with the religious and ecclesiastical reasons which have induced the Bishop of Rochester in his pastoral letter to plead for the conversion of the beautiful collegiate Church of St. Saviour, Southwark, into a pro-cathedral for that part of the diocese, but any one with any regard for the edifice, which has been of late years ruthlessly eclipsed by utilitarian usurpations, will gladly welcome Dr. Thorold's proposal. When we learn that the population of the newly constituted diocese of Rochester is roughly calculated to be, at the very least, one million and a half, and that it comprises the districts of Lewisham, Hatcham, Camberwell, Peckham, Sydenham, Battersea, Clapham, Streatham, Surbiton, Plumstead, and other places rapidly increasing in size and density, Dr. Thorold's proposal does not seem an unreasonable one. Indeed, if we take the bishop's figures, on the authority of Messrs. Williams and Shelford, C.E., while the area of the metropolis north of the Thames is 50 square miles, the area on the south of the river covers 68 miles; while the increase of population in the southern part has been at the rate of 57 per cent., as against 34 per cent. for the entire metropolis from 1851 to 1871. The increase in rateable value of the southern districts is also 127 per cent., as against 104 per cent. for the entire area. These figures are conclusive from a statistical point of view, but there are other, and perhaps more cogent reasons, for a new ecclesiastical centre. To use the bishop's words, "no measure of an external character would go further to consolidate our South London work, or to help to reconcile Surrey Churchmen to our new arrangements, than this of making St. Saviour, Southwark, the pro-cathedral of the diocese."

Should the idea be entertained—and we understand it is not the first time such a proposition has been broached—of making the collegiate church of St. Saviour the centre of the thickly-populated area of South London, a thorough reconstruction of the nave, and a restoration of the choir and Lady chapel as parts of the original edifice, would be the first step necessary. St. Mary Overie's Church originally belonged to a priory of that name, which stood on the north side between the church and the Thames, and we believe Mr. Dollman has lately made careful drawings from measurement of these buildings. The original church was built in the reign of Henry I. and John, but few traces of Norman work are visible. St. Saviour's Church is undoubtedly capable, in competent hands, of being converted into a structure at once efficient for diocesan services and an ornament to the Borough, and it is lamentable to think that so fine a church—one of the most beautiful of Early English type in our midst—should have been allowed to remain in the neglected and forlorn condition in which at present it is, surrounded by squalor, market sheds, and factories, and only opened for service on Sundays. The original nave—an illustration of which as restored by Mr. F. T. Dollman, from existing remnants—appeared in the BUILDING NEWS, page 592, Vol. XXXII., comprised seven bays, covered by a beautiful groined vault of stone of the 13th century, some idea of which may be gathered from the existing choir, which exhibits the purity and beauty of detail of the age, though itself of later date. The old nave was destroyed in 1839 having suffered much from neglect and decay, for in 1831 we find the roof was taken off by an order of the vestry, and the nave became so ruined that in the first-named year it was resolved to demolish it entirely. From indisputable evidence it appears the old nave was in a very tottering state ever since the 15th century, when the groined roof fell (1469), and it had also undergone three centuries of buttressing, bandaging, and bungling. What the old choir is now may be seen from the illustrations we gave of it in this journal, page 82, Vol. XXXIV., from Royal Academy prize drawings, made by Mr. G. E. S. Langford.

Entering the present church after considerable difficulty, what do we find to be the result of the restoration made about 30 years ago,—we believe by the late Mr. Gwilt? We enter by the south transept door. Neglect and dirt have done their best to disfigure, but the beauty of the unused choir, with its four bays of exquisite Early English, verging to Transitional in character, still remains to arrest the eye. The aisles and centre avenue are covered by a finely proportioned vault of quadripartite character, with groined ribs and cross springers of bold and telling section; but it is begrimed with dirt and soot. The massive and beautifully proportioned cylindrical piers, with their engaged shafts and richly moulded arches, are in a similar state; the stones are black and white in patches, the elegant triforium arcading and lofty lancets of the clerestory alike tell a tale of indifference and bigotry. Having inspected the choir and transepts we look at the disused high altar and Lady chapel, the latter an unique apartment of four bays in width, covered by a beautiful groined roof of stone supported on elegant pillars. It is fitted with seats; there is a small organ and a railed communion table at the north side, all in a very dirty and dilapidated condition, the lovely painted glass triplets shedding their coloured beams over a tasteless and disorderly arrangement, singularly expressive of a cold, heartless, and formal service. We next ascend some stone steps on the west side of choir, which is closed by an unsightly screen of late pseudo-Gothic taste, and enter at the level of the present church. A curious transformation presents itself. We are surrounded by an interior of the purest style of the early revival of this century. Pillars of iron-like proportions carry a triple vault of what looks like plaster; there is no clerestory—but, singularly subversive of truthfulness, the quasi windows of triple lancets, that outside range with the clerestory and counterfeit them, become the aisle lights within! A gallery of peculiarly unredeeming character surrounds the interior and cuts in two the aisle windows, while the organ is placed over the western door, blocking out all indications of the lancets in the west front. The green painted trusses under the gallery, the dark gallery front, and the impoverished flat-looking stucco windows to the aisles, are reminiscences of a taste happily gone by, and which no one except the Anti-Restoration Society would care to retain.

Now the first work necessary to make the edifice worthy of the Bishop's proposal would be the rebuilding of the nave—in fact all west of the transepts—and to lower the floor to the level of the choir, abundant material for which remains. We fear not a fragment of the outer walls could remain, the details of which are simply too bad to be left. It would be necessary, before such an operation, to carefully shore up the western end of the choir, particularly the crossing carrying the tower. Seven bays now exist, though a shorter one would suffice. The next step would be a thorough and careful cleansing and restoration of the transept, choir, and Lady chapel, which could be admirably adapted for the requirements of the services. The choir could be fitted for diocesan purposes, and would—as the Bishop observes—be "specially convenient," while the Lady chapel would make an excellent chapter or conference chamber. We have several members of the profession admirably fitted to undertake such a task. We may casually mention the names of Mr. Pearson, Mr. Blomfield, Mr. J. O. Scott, and Mr. Seddon or Mr. St. Aubyn—gentlemen in any of whose hands St. Saviour's, Southwark, might again become a well-ordered and beautiful church. Another very important and necessary improvement would be the provision of easier and more ample approaches on the eastern side. Instead of the present flight of steps from the road we should propose two, one on each side, and if it were practicable a widening of the cramped area by removing some of the property on the London-bridge side. At present the church seems to stand in a hole; the South-Eastern viaduct on the south side seriously mars its effect, and few people who pass and repass out of the daily thousands who cross London-bridge can be aware that the four small gables with their triple windows which appear to lie buried below the roadway form the Lady chapel of a priory church which dates from the Norman times, and belongs ao a most interesting mediæval church—no mean rival in date and completness with Westminster Abbey itself. We believe, with the Bishop of Rochester, if a suitable scheme were proposed of moderate outlay, Churchmen on both sides of the Thames would afford a willing aid, and the best ecclesiastical art of the day would be at their service.

THE PRESIDENT'S ADDRESS AND THE INSTITUTE.

MR. CHARLES BARRY, in his opening address the other evening, at the Institute, a report of which will be found in another page, travelled over a wide field, the subjects touched upon being almost encyclopædic in variety. It would have been better on the whole if he had confined himself within a more limited range of topics, or had at least directed attention more to the home interests of the profession than to the French Exhibition and foreign explorations. As regards the award of the French architectural medals, perhaps the less said the better, and if the recipients themselves feel honoured by the distinction no one need complain, notwithstanding the president so warmly rebutted the idea of any "rough and ready" process of selection. It is some satisfaction for English architects to learn that so large a number of creditable designs have been contributed by English architects. Architectural events of some moment have occurred during the past year, and some important changes have taken place since Mr. Barry's presidency. The question of illicit commissions has received attention from the Legislature; the matter of copyright in design has been agitated; the Metropolis Management and Building Act Amendments have become law; the Metropolitan Street Improvement Bill is taking a practical shape, the Local Government Board's new code of bye-laws has been discussed and issued, and perhaps on the whole a better relation between the Institute and the provincial members of the profession has been established. The institution of a new order of "honorary associates" must assist to increase the influence of the profession out of doors, and other changes of organisation—a report of which will be found in our columns—have removed another barrier between the two classes of members.

On the important question of "Competition," Mr. Barry's remarks cannot be said to represent the whole opinion of the

profession. It must not be forgotten that there are young members seeking for prestige and position as well as established practitioners. The recognition of the "quiet labour" and merit of which he spoke does not often fall to the share of those who do not inherit a name or a position; and the analogy drawn between architects and the professors of law and medicine has this discrepancy that in the one case the real results of ability are attainable, while in the other they cannot be obtained before employment. The acuteness of a lawyer or the skill of a physician is not recognised, and therefore cannot be forestalled before their services are called into requisition. So long as an architect's skill and taste are to be tested on paper, competition will be the selection of plans rather than of men, and the anxiety and disappointment arises chiefly from the incapacity of boards and individuals to distinguish between the work of the adroit artist and that of the skilful designer, or from their liability to be influenced by local or favoured competitors or their friends. We are quite willing to admit most of the grievances of the profession with respect to competition, but we may fairly ask how many of them have not been fostered and encouraged by architects themselves? Can we blame the public for obtaining architectural talent in the cheapest manner? Much may be said against competition as regards management, but how much may not also be said for it? And how many men have not won fairly-earned positions as architects through its agency? Did not Sir Charles Barry obtain the commission to erect the Houses of Legislature by competition, and have not most of the designs for our great buildings of recent times, metropolitan and provincial, been obtained in the same way? We have before urged that the architectural profession or the Institute are mainly responsible for the injustice of competition awards. If architects would band themselves together and issue conditions binding on and subscribed to by all the profession, the anomalies we now hear of would not be so common. We repeat, competition has been the only instrumentality that has brought into repute the young members of the profession, and the questions occur—Why should we abandon a system which elicits talent because of imperfect administration? And, Is it not the business of the Institute rather to reform abuses than to endeavour to abolish a deep-rooted custom?

The outside impression produced by Mr. Barry's address can be judged by an article in the *Times* of Wednesday last. It first wonders, in despair, at the amount of work the present generation has performed in building and restoration—the immense amount of architectural activity of the age, but does not pretend to determine its worth. It next maintains the absolute impossibility of establishing any agreement on questions of architectural taste; and, finally, takes refuge in Mr. Barry's address, and the assertion that our countrymen can hold their own by comparison with their brethren on the Continent. Such an impression measures pretty fairly the public confusion of mind on matters architectural. The styles we work in are like a conflict of creeds to them—a bewildering maze from which they can draw little satisfaction. The writer says, "It may be true that we shall be more distinguished hereafter by the unwearied energy of our aspirations than by our successes in fulfilling them;" that we "scoured the history of architecture to find something that we might at least copy, and repeat with some sense of satisfaction, and that we never discovered anything with which we could be content." The *Times* asks, "Has any one a good word to say for the builders of the age of George III. and George IV.?" without knowing probably that our architects are beginning to see beauty in the Georgian no less than in the Queen Anne era. It speaks of the stately houses—the Italian palaces reared by our large manufacturers—more frequently castellated mansions, which look as if they were intended to resist enemies, but most common of all a "house of many bays, oriels, turrets, and gables, in which the architect has sought to catch the tradition of Hatfield, of Longleat, or of Burghley." It alludes to our street rebuilding, our activity in church building and restoring, and the equally large field of activity in the erection of buildings for national and municipal purposes. No wonder these visions of the past perplex the public, and the writer refers to an instance of this diversity in taste which occurred last week, when Mr. J. O. Scott spoke of the copper spire of Battersea Church as "absurd"—an epithet which has called forth indignant remonstrances.

Mr. Barry's address dealt very inadequately with the future of the Institute. He, indeed, insisted on the importance of its becoming an active worker rather than a passive witness—a remark very much to the point when we consider the programme for the ensuing session, in which are enumerated six or seven papers on archæological matters to begin with, while of the remainder there are only four of any real value to the profession—namely, "Bills of Quantities, and their Relation to Contracts," by Mr. John Honeyman; "Lighting by Electricity," by Mr. Horace Jones; "The Modern Restaurant," by Mr. Thomas Verity;" and "Improvements in Glasgow and the City Improvement Act," by Sir James Watson. These are current subjects of public and professional interest, and more like them would be useful and welcomed.

CONTRACTS NOT UNDER SEAL.

A REPORT of a case of considerable interest to architects and builders who may be likely to have dealings with corporate bodies appears in another column. Very few instances have come under our notice wherein an architect has suffered such injustice, and we think it a duty to give a few particulars respecting the case, which do not appear in the report, but which nevertheless have, as it will be seen, an important bearing on the matter.

Four years ago the Wimbledon Local Board, having resolved to erect new offices for the purposes of the Board, directed their surveyor to instruct Mr. Hunt, who is a well known London architect and a partner of Mr. Verity, of Regent-street, to prepare plans and designs for the proposed buildings. These were accordingly prepared by Mr. Hunt, and submitted to the Wimbledon Local Board, who approved of them, directed quantities to be taken out in accordance therewith, and advertised for tenders for the erection of the building. When the tenders were received it was alleged that the estimated expenditure had been exceeded, and that the plans were, therefore, useless. As a matter of fact we believe the plans were rejected, mainly at the instance of a member of the Board, who on the strength of his practical knowledge guaranteed to erect a building equal in all respects to that designed by Mr. Hunt for half the money. The usual local squabbles ensued, and ultimately the Board determined to have a competition. The competition was duly arranged, and the design which proved successful, and which was ultimately adopted, proved to be that of a local man. Anybody who cares to know what we thought of it may refer to our report on p. 513, Vol. XXXI. We put the matter as mildly as possible then by recording our conviction that the Board had not done themselves much credit by their selection. We are quite sure now that they have acted most discreditably in their treatment of Mr. Hunt, who was first employed to prepare plans and who ought to have erected the structure which is now built from the design of the successful competitor at an estimated cost of £2,750, "including decorative finishes." We have every reason to believe that the estimated cost has been exceeded.

Finding that there was no chance of his designs being carried into execution, Mr. Hunt applied for payment, and this being refused brought his action. The claim was so transparently a just one that the only defence the board could plead was akin to that of a spendthrift who swindles his creditors by proving himself under age. They submitted that by the Public Health Act, 1875, sec. 174, they, as a corporate body, were only authorised to contract by writing under their corporate seal in all cases where the subject matter was of greater value than £50. The jury found that the Board *had* authorised their surveyor to procure the plans from Mr. Hunt, and ratified his action in the matter, that the new offices were necessary for the purposes of the Local Board, and that the plans were necessary for the erection of the offices. In spite of the verdict of the jury, Mr. Justice Lindley, who tried the action, reserved the point raised on behalf of the Board, had it argued before him after trial, and ultimately decided that the plaintiff could not recover as his contract with the defendants was not under seal. Mr. Hunt then appealed, and the case came before the Supreme Court at Westminster on Friday last, before Lords Justices Bramwell, Brett, and Cotton, when Mr. Justice Lindley's decision was unanimously affirmed, although Lord Justice Bramwell, in giving judgment, admitted that in a former case "Mr. Justice Blackburn had said that in certain cases justice and conscience appeared to be in favour of holding a corporation liable though the contract was not under seal." His lordship's subsequent remarks about "careless and slovenly people who chose to act otherwise having to take the consequences," and the probability that if "more solemnity"—fancy the "solemnity" of a local board!—"had been used in the transaction, those who gave the order would have been more careful as to expense," savour of the petty technicalities so dear to the legal mind, and manifest a total want of appreciation of the relation in which an architect stands to his client.

The upshot of the affair is that Mr. Hunt has lost the money he honestly earned, and has moreover been saddled with the costs of the two actions. The local Board escape altogether the consequences of their unjust conduct, and their disgraceful plea has been held to be a good defence, although it is notorious that the surveyor who took out the quantities for Mr. Hunt's plans has been paid, and that a surveyor who previously supplied quantities to the same board for sewerage works executed by them has been paid, although in neither case were the agreements legalised by the presence of the corporate seal. Mr. Hunt has been urged to take the matter to the House of Lords, and to appeal to the Institute for help and counsel; but his previous experience of the glorious uncertainty of the law is not of a nature to encourage him to take this course, and the decision as it stands will probably remain a precedent, of which all architects will do well to take most serious heed. It is perhaps too much to expect the Institute to take any action in the matter, although such a case seems exactly one for the consideration of a body which is supposed to represent the

profession and to guard its interests. Every member of the profession likely at any time to be employed by any corporate body had better cut out Section 174 of the Public Health Act of 1875, and keep it by him in a conspicuous position; and in sending in competition plans it would constitute an admirable motto, full of significance to corporations capable of imitating the conduct of the Wimbledon Local Board. Of course it is practically impossible for an architect in all cases to insist on the fulfilment of this formality. Any amount of sharp practice has been endured almost as a matter of course in competitions, but the matter once settled, the order once definitely given, not one architect out of a hundred has ever troubled himself about the absence of what turns out to be an indispensable adjunct. Henceforth it must be borne in mind that corporations are equally as dangerous "without seals" as "without souls."

We know very well that many other architects must have encountered similar difficulties in obtaining payment for their work on account of the difficulty of fastening the liability on the right debtor. We know of a case just now in which an architect prepared two sets of designs for the restoration of a church, and spent out of pocket about £80 in travelling expenses and sundries. Funds could not be obtained by the building committee, and the vicar in the meantime left. His successor disclaimed all liability, the building committee is dissolved, and the former vicar is equally unwilling to pay, though he, of course, gave the instructions. Such difficulties are common enough, but they are, of course, of another order altogether from that referred to in connection with the Wimbledon Local Board, which has shirked its legal liabilities—not because they were not justly and honestly incurred, but because—possibly knowingly and in preparation for repudiation—they were entered into in a legally incomplete manner.

THE ROYAL ACADEMY ELECTION.

THE following account of the election of the new President of the Royal Academy, on Wednesday evening, the 13th inst., will probably be of interest. The ceremonies of such a meeting have doubtless been established by the precedent of former elections, but it may be worth while to describe briefly the course which was adopted. The chair on such occasions would be taken by the Academician of longest standing, and therefore should have been filled by Mr. Solomon Hart, but this gentleman proposed that the Keeper should take the chair, and Mr. Frederick Pickersgill was accordingly selected to preside. Previous to the formal business three new members, who had deposited the requisite works, had their diplomas signed, and took their seats as Royal Academicians — namely, Messrs. Orchardson, Yeames, and Norman Shaw. The diploma works sent in by the two former members are, we believe, merely provisional; Mr. Shaw has presented the designs of a house now being erected under him in Shropshire.

Every member of the Academy was found to be present. We believe such an event has never previously been recorded, and as one retired member, Mr. T. Webster, who has the right of voting on such occasions, also attended the meeting, there were 41 members assembled. The new system of taking a test-vote by scratches having been resorted to as a preliminary to the ballot, it appeared that Mr. Leighton had no less than thirty-two scratches; the only other member for whom sufficient marks were recorded to enable him to go to the ballot was Mr. John Horsley, who had five scratches. The latter gentleman at once rose and gracefully proposed that Mr. Leighton be elected without ballot, and his proposition was unanimously adopted. Only three other members, we understand, obtained scratches, Sir John Gilbert, Mr. Richmond, and Mr. Millais. At a subsequent meeting of the Council, it was announced that the Queen had intimated her approval of the selection of Mr. Leighton, and the President elect will accordingly proceed to Windsor on Monday next to be invested with the gold medal—the badge of office. It is not likely that on that occasion the honour of knighthood will be conferred upon Mr. Leighton, though it is invariably offered to the President of the Academy, and has been accepted by all the past presidents with the exception of Mr. Benjamin West. That gentleman, being a Quaker, felt bound to decline the proffered honour as opposed to his religious tenets. Mr. Leighton's election will, we are sure, as we said last week, be very popular among artists of all grades, and it would have been difficult to have named any gentleman equally fitted, by his attainments, for the high position of President.

THE GAIETY RESTAURANT.

LAST week we gave a general description of the new Gaiety Restaurant, which has been remodelled at a considerable expense from the designs of Mr. T. Verity, for Messrs. Spiers and Pond. Owing to the very short notice we had of the opening before going to press it was impossible to describe in any detail a few of the more interesting features of the structure, and we therefore take an early opportunity of saying something of the fittings, lifts, ventilation, and decorative details, which may be regarded from an economic point of view as tolerably perfect of their kind. Adjacent to the grand luncheon buffet and table d'hôte we described last week, and also in direct communication with the kitchen, grill, and supper-rooms, are a series of lifts. These have been fitted up by the well-known firm of Messrs. Archibald Smith and Stevens, of Princes-street, Leicester-square. As very complete and efficient appliances we may give our readers some idea of them. They comprise a hydraulic goods and passenger lift, a continuous lift for food and kitchen service, four hand lifts for distributing the viands and wine, and a small lift for carrying wine bottles. Directing attention to the hydraulic lift we find it to be provided with every requisite necessary to bring it under control. In connection with it is a small pumping engine, which forces water into an accumulator under considerable pressure. We may here give the engineer's own description of the action: Beneath the lift a strong horizontal cylinder is fixed, containing a sliding ram carrying at its head four wheels ranged side by side; at the back of cylinder are four similar wheels, and round the whole system is wound, in a similar manner to a rope in pulley-blocks, a chain, which is continued up the lift shaft over a pulley at the top, down, and finally attached to the cage. When down the ram is "home" in the cylinder, and to make an ascent water from the accumulator is admitted to the horizontal cylinder, the ram of which is forced out, thereby lengthening each coil of the chain at the expense of the portion between the head wheel and the cage, and causing the cage to ascend. The cage regulates the flow of water, and automatically stops at either limit of its journey, and therefore does not depend for safety upon the attendant. We observe a further safeguard is provided against breakage of the suspending chain in the shape of springs and arms attached to the cage, which are released and engage in recesses in the guides, thereby arresting the cage at any point. The pumping engine works automatically, continuing to pump until the reservoir is full, when it stops. Directly the load commences to drop the engine recommences pumping, and continues till the reservoir is again full. The "continuous" lift, which will form an equally useful appliance, is a kind of "Jacob's ladder," and chiefly consists of two endless chains passing over wheels at the top and bottom of shaft, a number of cages being placed between them, so that they are in constant attendance upon the waiters for the reception of luggage, &c. Motion to the wheels at the top is given by a "West" six-cylinder engine, and the chain with its cages are continually travelling down the front with clean dishes, &c., and up the back of shaft, just sufficient speed being maintained to allow of their being loaded or unloaded between the different floors. The West engine is quite a prodigy; it is made to stand on the top of a 14in. wall, and measures only 18in. × 12in., but is of 3-horse power. We may merely say of the hand-lifts that they are provided with a brake arrangement in constant action, and are held off by a foot lever when working the lift, so that any diversion on the part of attendant causes the brake gear to act and stop the lift.

Alluding to the fittings of the *cuisine*, we may mention the grills are supplied from two large "grids," the hot-plate arrangement, by which means the customer may see the cooking operation going on, while a glass screen prevents any of the fumes entering the dining-room; also the culinary department at the top, in which may be seen some excellent appliances, provided by Messrs. Benham and Sons, such as ovens, boilers, jackettes, and stew-pans, the vegetables all being cooked by steaming.

We have already spoken of the general decorations in the luncheon-buffet, the tile paintings of Shakespearian and festal subjects, &c., a work which reflects credit upon the artists—Messrs. Simpson and Sons, of St. Martin's-lane. It may be worth adding that these decorations are in the Renaissance style, and if we cannot always approve of the design or colour, we must acknowledge that considerable taste and judgment has been displayed to render the apartments in a style becoming a building of a gastronomic or festal character—a somewhat trying condition for the artist. In the centre of the buffet ceiling is an ingeniously designed monogram of the proprietors with allegorical accessories. Its ventilation has been promoted by sunburners enclosed in bell-shaped funnels in the ceiling. The entrance from the Strand is through a spacious square vestibule, the floor of which is laid in the durable and very effective marble mosaic paving of Messrs. Burke and Co., of Newman-street, W. We scarcely like altogether the dark-green arabesque panels of the grand staircase, though they have a rich effect in a general view. Signor Marolda is the artist. The pattern is rather too obscure, and the material is a French textile painted; the dado decoration lining the stairs is of dark purple tiles, and the balustrading is of bronze and massively treated. In the centre of panelled ceiling is an allegorical painted representation of the goddess of music, of colossal size. We may mention the name of Mr. Edwin P. Turner as one of the artists engaged. On the whole, we confess the painted decorations and the general scheme of colouring are elegant and appropriate, and the artists engaged seem to have considered in their selection of colours those which are rather softened, and harmonised by artificial light, under which the Gaiety Restaurant will be best seen.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

THE opening meeting of session 1878-9 of the Institute was held on Monday evening, the President, Mr. Charles Barry, in the chair. Mr. F. S. Pilleau, of Buckingham-street, Strand, was elected an associate; and Mr. W. Calder Marshall, R.A., and Sir Richard Wallace, Bart., K.C.B., M.P., as hon. associates. Messrs. Frederick Leighton, P.R.A., Geo. Richmond, R.A., and L. Alma Tadema, A.R.A., attended for the first time since their election as hon. associates, and were welcomed by the chairman amidst applause; Messrs. Sydney H. Turner, W. H. Arber, and R. C. Page were also received as associates. Mr. WHITE, secretary, reported that 248 vols. had been purchased for the library, and 16 had been presented; besides this 249 books had been bequeathed by the late Mr. C. C. Nelson.

THE LATE MR. F. P. COCKERELL.

The PRESIDENT proposed a vote of thanks to the donors, specially alluding to what had, unfortunately, proved the posthumous gift of Mr. Nelson. Beginning with this mournful subject he had to refer to another great loss the Institute had sustained in the death of Mr. Cockerell. He had died in harness, and dearly beloved by all who knew him. While on a short holiday at Paris he was suddenly seized with illness, and in five minutes was summoned into eternity. The funeral took place in Paris, and at it the Institute was not altogether unrepresented, although he himself was unable to be present, for their secretary, on receiving the sad intelligence the day before the funeral, at once left for Paris, and with three other members who were in Paris, and Mr. J. L. Duc, architect of the Palais de Justice and other Parisian members of the profession, attended the funeral.

Professor DONALDSON alluded to the genial disposition and artistic tastes of their late friend, Mr. Cockerell, and to the courteous manner in which he carried out his works, and proposed a resolution thanking, in the name of the Institute, the French architects who paid a tribute of respect to his memory by attending the funeral—a motion seconded in appropriate terms by Mr. WILLIAM WHITE, F.S.A., who was one of those who attended the funeral, and agreed to.

REPORT ON THE PARIS EXHIBITION.

The SECRETARY read the report to the council of the Paris Exhibition committee, drawn up by Mr. T. Roger Smith, hon. sec. In all 171 drawings and photographs, sent by 64 contributors, were hung in the gallery allotted to British architecture, the work of hanging being carried out by Mr. Roger Smith. The President of the Institute was appointed sole juror to represent Great Britain and the Colonies on the International Jury for Architecture; the other jurors were:—For France, MM. Ballu, Lefuel, Duc, Bœswillwald, and Vaudremer; Austria, Herr Ferstel; Italy, Commander Basile, of Palermo; Belgium, M. de Stuers; and Egypt, Mariette Bey. It was explained in the report that "the jurors on fine art juries were not ineligible *ipso facto* for medals and distinctions, as was the case with members of industrial juries, but in the architectural jury all the members voluntarily withdrew their works from competition. It will thus be seen that not only did Mr. Barry's services as juror involve a large expenditure of time, and no small expense, in addition to that caused by his work as a member of the commission (both offices were entirely honorary), but it resulted in the drawings which he exhibited being entirely withdrawn from competition." In addition to a considerable number of awards (published in the BUILDING NEWS of October 25, p. 421) the jury came to a resolution testifying their sense of the special interest of the British exhibits, and expressing their regret that they had not a sufficiently large number of prizes to reward them in due proportion to their merit, and requested Mr. Barry to convey to the exhibitors this unanimous expression of opinion.

The report was adopted, on the motion of Professor DONALDSON and Mr. WHICHCORD.

OPENING ADDRESS.

The PRESIDENT delivered his opening address, which, as the third and last he should give at the commencement of a session, he introduced by reviewing the comparative position of the Institute in 1876, when called to the chair, and at the present time. The strictly professional class had increased in the two years from 615 to 649, and, as 15 had died, the real increase was 49, or 8 per cent. The non-professional members, honorary fellows, and honorary associates had increased, notwithstanding the abolition of the class of contributing members, from 636 to 744, an augmentation of 108, or 17 per cent. Notwithstanding the raising of non-metropolitan members' subscriptions the number of members not living in London had increased from 272 to 290, and, as 6 had died, there was an actual increase of 24, or 9 per cent. He could also congratulate the members on the state of their finances. In 1876 the income (exclusive of all trust moneys) was £2,153, while in 1878 it was £2,417, up to the present time showing an increase of no less than £254, or nearly 12 per cent., and he saw no reason why this increase should not continue. In reference to the expenditure which might be temporarily necessary for their better accommodation he would add that the invested capital (exclusive of trust investments) was now £5,512. The library had increased from 3,000 to 3,500 vols., exclusive in each case of periodicals, and the number of readers from 268 to 596 per annum. He appealed to the members for contributions to the collection of drawings of old buildings, pointedly hinting that the new members, for instance, the two sons of the late Sir G. Gilbert Scott, would doubtless find it in their power to aid them in this respect when they had time fully to examine the numberless drawings which their late father must have left behind him, from his special practice as a restorer. The members still found themselves in their accustomed rooms, though no longer suitable or spacious enough for their needs and increasing numbers. He would not anticipate the special report which the council would shortly lay before them further than to express his personal hope that, whether they remained here or found a new home elsewhere, the general body of members would take a broad and comprehensive view of the matter, not contenting themselves with small treatment, which would lead to present waste of money, and ere long need to be re-considered, but looking rather to the Institute of the near future—as it ought to be, as it may be, and, with united action on the part of all, as it will be. It might perhaps be wisest for the present to content themselves with temporary expedients for greater comfort until they felt themselves in a position to obtain a really permanent home for the Institute of sufficient size and dignity to deserve that name. Passing from this topic to the obituary of the past year the president referred to the losses sustained by the deaths of Sir G. Gilbert Scott, R.A., past president; Messrs. Sydney Smirke, R.A., and Chas. Charnock Nelson, past vice-presidents; and F. P. Cockerell, hon. secretary; Messrs. Albert J. Humbert, Henry Baker, Matthew Thompson, and William Fogerty, fellows; M. Charles César Benignat and Signori Mengoni, of Milan, and Enrico Alvino, of Naples, hon. and corresponding members; and Messrs. Charles Challoner Ogle, Hartley W. Burgess, and Charles Rowe Dillon, associates; giving biographical details of each. With reference to Mr. C. C. Nelson the President remarked that he seemed to deem this Institute as almost his first care in life. Fortunately for his peace of mind, Mr. Nelson had sufficient means to render great toil in professional practice unnecessary, and he thus had leisure to pursue his literary studies connected with our art with calmness and pleasure; and I can testify, from personal experience, that even in the latest years of his life, which, alas! were years of much suffering, he was kindly and keenly alive to all our doings, our hopes, and efforts, and expressed to me his full and entire sympathy with all our proceedings since I became so deeply responsible to you as your president during years of change. Mr. Nelson was a pupil of Sir Robert Smirke, and of the late Mr. Nicholson, with whom he was in 1825. Then he spent some time in travelling in Italy and Greece, and was some time resident in Rome, about 1834. He joined the Institute in 1843, introduced to it by Professor Donaldson; became a fellow in 1847, member of council in 1848-49, and from 1850 to 1861 undertook the trying and unremunerated duties of honorary secretary, in company with Mr. J. J. Scoles, and afterwards with the late Sir M. Digby Wyatt, and our good friend, Professor Hayter Lewis, revising and condensing the papers read for publication with unusual judgment and tact. Elected again on the council in 1863, he resigned the general secretaryship, but undertook the duties of honorary secretary for foreign correspondence, and being an excellent German, French, and Italian scholar, filled that office most ably. In 1864 we find him acting as vice-president, and he continued on the council till 1867, when he retired from active professional life, and some years later became a constant sufferer from the complaint which has now ended only by his death. He was one of the acting committee of the "Architectural Publication Society's Dictionary," and in its revision for the press his services were invaluable, extending over the whole range of that great work from letters A to P. He was also a director of the Architectural Union Company. Zealous, hard-working, with cultured mind and refined taste, Mr. Nelson was one of those men whose quiet, unobtrusive, but essential work avoids special public notice, but is none the less deeply appreciated by his friends and colleagues during life, and remembered with deep regret when no longer at their command. Amongst the more important events of the past year the recent Exhibition at Paris may be placed first. The President referred to his appointment as a member of the Royal Commission, representing England in the architectural department of the fine arts section, and explained the nature of the duties devolving on its members. The final report of the jury had now been made public, and they would note with pardonable pride that, in the award of prizes, English architects had been adjudged a larger number than any other country, except France, the number of whose exhibits (many of rare excellence) amounted to nearly half of the total number sent by all other nations combined. I see, Mr. Barry added, that a writer in one of our professional journals, when the names of the English recipients of prizes for architecture was informally made known some time ago, was so good and so ingenious as to suggest or concoct a supposed system he thought was probably adopted by the jury in making the awards. Whether such a mode of making the awards would have commended itself to the judgment of the jury, had it been suggested earlier, I cannot say. It would certainly have abridged their labours very materially, but it will be more satisfactory to you to learn (and perhaps also to the writer) that no such rough and ready mode was adopted, but that repeated scrutiny and repeated votes were needed exhaustively to reduce the number of meritorious works to the comparatively small number of prizes at the disposal of the jury. During the year the Metropolis Management and Building Acts Amendment Act, promoted by the Metropolitan Board of Works, had become law. In its preparation the board sought the assistance and advice of the Institute, and in the event the views of the Institute Committee commended themselves to the Committee of Parliament and are practically embodied in the Act. Am I (asked the President) to congratulate you that the "illustrious stranger," the Egyptian (now British) obelisk, has at length quietly settled among us? On the whole, I suppose I may, but it is with no unmixed feeling. A public, professional and lay, tired out with giving "unheeded" suggestions—at last left to those immediately interested the decision of the question as to site and treatment in which the public would, if more permitted, have taken even a deeper interest. The result is before us and the weary wanderer is at rest. But how? Quietly buried (I mean erected) in this great Babylon among houses and buildings that overtop it; squeezed into an unpretending nook obtained with difficulty from our corporate ædiles. A monolith of unknown age—a witness of a period past so remote as to be realised with difficulty—a mass of 200 tons in weight, evidencing a labour and probable sacrifice of

human life at its birth which must be left to the imagination—finds itself upreared on a pedestal composed of small stones (old materials in fact) instead of on a monolithic mass worthy of itself; pushed into a waste corner of our river wall, central with nothing around, and lastly, on a low level instead of on such an elevation as might add to its importance in place of lessening it. How differently and with how much dignity and taste our French neighbours have treated their obelisk in the Place de la Concorde we must all be too painfully aware. In deploring the result, which I think could hardly occur in any other European metropolis than our own, be it fully understood that I do not detract a jot from the well-merited praise and sympathy due to the zealous private citizen and the talented engineer, who with so many unexampled difficulties have yet brought to us this relic of the past. But what I deplore is that our national—or our hardly less powerful municipal — Government did not take the matter into their own hands so far as regards a suitable site and a dignified treatment of the monument as to its substructure, and did not undertake to secure the best and most impressive surroundings for such an addition to the interest of this metropolis. The question of architectural competition seems next to demand a word from me. A condition of things created and maintained entirely by ourselves, and, as I think, an unhappy condition of things for all parties, wherein we are placed in the position of "touting" for work which should come to us as a right and a compliment. Heartburnings, disappointment, and jealousy are the children of the system; while the specious suggestion, that by this means alone, or chiefly, true merit is to be unearthed and recompensed emanates surely from some malicious sprite who joys in our distress and divisions. The mistaken public view of competitions is of course largely due to our young and zealous architects who desire sometimes to run before they can walk, and rush into attempts, repeated to their sorrow again and again, which, alas! bring only occasional success against enormous disappointment. They would really gain, if they could only think so, by doing patient, quiet, and even unknown good works, bringing no disappointment and only delay in the recognition of their power, which then becomes by experience greater day by day. No other profession than our own is placed systematically in this position, yet the "men of mark" arise from their respective ranks in each profession as they have the right and title to do. Why should we alone induce the public to hold us cheap by cheapening—I had almost said obliterating—ourselves? An occurrence within my own knowledge during the year past has led me into these remarks, and may have some interest for you. In March last the Commissioners of Hove, in Sussex, desirous of obtaining a design for their proposed Town-hall, inquired of me, as for the time being president of the Institute, whether in my opinion "with a view of avoiding the unseemly discussions that have recently taken place with regard to open competitions, an open competition for such a work would be desirable in all respects, or whether it would not be better to limit the competition to eight or nine well-known men of ability." To this I replied that, in my opinion, an open competition was the worst course possible. That a limited competition was only less bad, and that in my humble opinion the best course was not to choose from plans, but to choose a man "as carefully as they could, whether by vote or otherwise in a committee (as they would indeed choose a solicitor or a physician), and having chosen him, to put themselves in confidential communication with him from the outset, "and thus save time, money, and temper;" while disappointed competitors would be spared "that feeling of soreness which arises against a system which requires many men (earning their living by hand and head work) to give to a client many designs while he will actually only pay for one." The Town Council took my advice, and decided not to ask for plans, but to consider six names which presented themselves to them, and you will feel with me, I think, they will have no reason to regret the course I advocated when I tell you that their choice fell on Mr. Waterhouse, who will, I doubt not, produce a design in the credit of which we, his brethren, may feel some reflected share, though of course the full measure will be his own. I have reason to believe that this is not a solitary instance of "a man" being chosen by competition in place of the present system of "a plan in competition." I trust the habit may grow, and I feel sure that in the end architects as a body would rejoice in the change. Reference was next made to the recent masons' strike, wherein it was remarked the exhaustion of the workmen which appeared the only reason for their ultimate submission, gave no guarantee against the recurrence of similar disputes under circumstances possibly less peaceful in results. Having alluded to the General Conference of Architects, the year's progress in archæological research was adverted to as not equal to that of some former years. The site of ancient Dodona had been identified by Mr. Carpanos, and in Apulia the long-buried city of Sipontum was being disinterred from beneath 20ft. of volcanic ashes by order of the Italian Government. In Palestine, the exploration committee having completed a survey of the country west of the Jordan, were about to excavate in the neighbourhood of the Sea of Galilee. Whilst sympathising cordially with the committee, he remarked on a singular imperfection in the composition of the proposed exploring staff, which is to consist of Royal Engineers, a geologist, a naturalist, and an Arabic scholar, but no architect. In a passing reference to the papers of last session the president took the opportunity to urge on the members the need that they should courageously take up the challenge frequently made, and discuss questions affecting the life and happiness of those whose houses they were called upon to design and arrange. It ought to be impossible to allege with truth that architects only cared for the æsthetical, and delegated to subordinates the vital matters of ventilation, warming, and sanitary arrangements. In conclusion the president dealt with the past and future of the Institute, urging that the increase in their numbers of every class proved that the recent constitutional changes would work well and be found beneficial. He contended that the new policy towards non-metropolitan members could not justly be termed one of "centralisation," but rather of "circulation." He earnestly hoped that during the coming year some scheme of mutual systematic working together for professional objects throughout Great Britain and Ireland would be brought about, and he believed that the difficulties in the way, if fairly faced and grappled with, would not prove insurmountable. The unexpectedly large number of artists, church dignitaries, members of Parliament, antiquarians, amateurs, and dilettanti enrolled in the new class of honorary associates was a source of gratification, and he confidently looked forward to the continued increase of that class. Finally, he asked the members—Shall our Institute henceforth be an active or a passive body? In its earlier years it was necessarily more or less passive, but during the last few years, however, it had entered into a more active phase of existence. Its finances, its earnestness, its diligence, and therefore its powers, had largely increased. It labours had been extended into new grounds of action. Its opinion and its assistance had been solicited as it never before had been. Its council had been more and more frequently called on to decide questions arising on professional practice, and to arrange difficulties between professional brethren, and between architects and their clients. It had become, in fact, more known; had interfered with some effect in public affairs, and had enrolled among its members a larger average annually of professional men in all parts of the kingdom than formerly. It had further enrolled in the new class of honorary associates a number of that outside public to whom previously its existence was unknown and uncared for, and these had testified their sympathy with it by attending its meetings, joining in its discussions, and even contributing papers to its transactions. It was for the members at large to say whether their representatives in the council had correctly interpreted their wishes; and if they had done so they would, he was sure, afford them in the future, as in the past, a hearty and cordial encouragement. He dared to be confident on which side the verdict would be given, and to anticipate for the Institute a growing and still growing importance and usefulness.

Mr. T. H. Wyatt proposed a vote of thanks to the president for his interesting and instructive address. He would suggest, however, that future presidents, who would be elected for two years, only should be expected to give so full a paper at the termination of their labours, preparing but a brief statement for the beginning of the second session. He agreed with the president that, seeing the large increase of members which was taking place, it would be most unwise to expend large funds on the present premises. He hoped that either they would get larger premises or obtain a better standing in these. The long list of deaths he had read had filled them with regret, and not least sad was the mention of Mr. Cockerell. The son of their first professional president, he was an artist of great promise, and had already gained the confidence and regard of his clients. On the subject of competitions the president had so fully expressed his opinions that he cordially concurred in his remarks.

Mr. Frederick Leighton, P.R.A., who was greeted with continued and cordial applause, said: Mr. President, the members of the class to which I have the privilege to belong—namely, the honorary associates of this Institute—will, I am sure, feel it a very great honour that one of their number has been called upon to second the motion of my friend, Mr. Wyatt, that the thanks of the meeting should be accorded to you for the most remarkable address you have given us. I feel very much pleased indeed that the honour should have been laid upon me, and I will do so with the utmost brevity—partly because I am loth to trespass at this late hour on your patience, and partly and chiefly because I feel that in the lucidity of those statements, the breadth and elevation of the views which it exhibits, and especially in the satisfactory character of the general tenour, your address stands self-recommended. You have unfolded before us a picture of prosperity, of beneficent and enlightened influences, which must be highly gratifying to all the members of this Institute, and which I believe is highly encouraging to those who look upon its work simply from the outer precincts as I do myself. But the picture you have drawn is nto unchequered. It has its dark shadows and contrasts, and in the long obituary roll which you recorded there are several names which I personally cannot hear without emotion. In the list were the names of two honoured members of that academy to which it is my chief pride to belong, and the name of one of the dearest and truest friends I ever had—a man who had the rare gift to win, and yet rarer gift to retain, the affections of those who had the privilege of knowing him; his loss will be irreparable to those to whom his memory will be dear. It would be impertinent in me to attempt to touch on those portions of the address which had special reference to the particular work of the Institute, but you alluded to one or two points of general interest upon which you will perhaps allow me to say a word or two. And first you alluded to that ancient obelisk which has lately been erected—I had almost said unlaid—on the parapet of the Thames Embankmeet. I agree with you in feeling a concern at its latest vicissitudes. That venerable monolith is an old friend of mine, for I have had the privilege of seeing it on more than one occasion. I have seen it slumbering upon the sands of Egypt under an Egyptian sun, and on the margin of bluer waters than are to be found in Old Father Thames; I saw it again, encased in the Cleopatra, ploughing the blue waves off the coast of Morocco; I have seen it also seeking in vain for the sun, in its latest vicissitude, showing to generations to come what can be achieved by the munificence, patriotism, resources, and skill of the British engineer, and showing also how a monument may be placed in such a manner as to defy and set aside all the eternal fitnesses of things æsthetic. Adorning nothing, emphasizing nothing, by nothing emphasized, the obelisk has been placed as it were parenthetically between two highways, perhaps the finest in the world, but neither leading up to, but rather running past it. As to competitions, I am in harmony with you. I share with you grave doubts as to whether they are the best

means of ascertaining talent, or whether they always result in the survival of the fittest. In your address there was one point only in which I have something to add beyond what was said—namely, the exhibition at Paris. You have told us with pride the large share of honour which was justly accorded to British architecture, but you have not told this assembly the golden opinions and high esteem which you won on that occasion. I had the honour to serve with your president, Mr. Barry, on the British Commission. I had, when in Paris, the gratification to hear M. Ferstel point out the uncommonly high character of the architecture of Great Britain to that jury, and therefore I am in a peculiar position of ability to testify from my own experience and my colleague's authority to the untiring zeal and the genial catholicity and admirable tact which made Mr. Barry so valuable a member of that jury, and, if I may be permitted to judge, so admirable a president of this Institute. My sense of these qualities of your president greatly increases the pleasure with which I second the proposition that our thanks be accorded to him.

The motion was carried by acclamation, and acknowledged in suitable terms by the president.

COAL, MINE GASES, AND VENTILATION.*

A TREATISE on coal gas and explosions in mines must have just now more than usual interest, and we welcome a work on the subject written by a Fellow of the Institute of Chemistry and an authority on the gases of coal. To those parts of the treatise, however, treating of the chemistry of coal, of combustion, and of explosion, we shall not here refer further than to say that the chapters contain much valuable information which will be read with profit by colliery managers, engineers, firemen, and others. A more directly interesting chapter to the profession is that on ventilation. After some elementary observations and a statement of general laws, the writer enters into the subject of mine ventilation. The temperature at certain depths below the earth's surface is of considerable moment in ventilating a mine. Thus for every 60ft. in depth there is a rise of 1° in temperature by Fahrenheit's scale, according to some authorities after the line of mean equal annual temperature has been passed, but the author regards this as a somewhat high estimate. It is, however, necessary to make some correction for the rise of temperature experienced at the bottom of a mine. Various influences, such as lung expiration of men and animals, burning of oil, &c., tend to raise the temperature. A temperature of 80° is to be avoided, and it should not be allowed to rise above 70°, as a higher temperature holds the gases and organic matters evolved in addition to the gas given off by the coal. Various appliances are mentioned, the main object of which is to increase the current through the shafts, such as by applying heat in the upcast shaft. A direct application of heat by a furnace in the upcast is the chief kind of power adopted, by which rarefaction is produced and the workings experience a constant change of atmosphere. The action of this circulation of course depends on the heavier column of air in the downcast shaft forcing upwards the more rarefied and lighter column in the heated shaft. The author says, "in spite of the numerous inventions for producing ventilating power, the furnace has not fallen into disuse nor is it likely to. Its simplicity and easy adoption and continuity of action will ever continue to give it the preference in deep mines when proper attention has been paid to the laying out of airways of ample area." Among mechanical appliances we may mention the fan ventilator, as the Guibal fan, often large and much used on account of its simplicity, the machines of Fabry and Lemielle—one consisting of broad vanes revolving in opposite directions, and the other of a drum placed eccentrically in a large chamber provided with shutters, so arranged as to remove the air during revolution. On the air-pump plan numerous ventilators have been invented, such as Nixon's, Struve's, and others, but few of these inventions have as yet been adopted. With regard to this part of the subject there appears to be a want of technical information, and a few diagrams of some of the fans would have considerably increased the value of Mr. Thomas's book. There is no doubt the furnace will continue to be the most natural and reliable motive power in mine ventilation, as indeed in every kind of ventilation. There is no risk of its getting out of order like a piece of machinery, and thereby imperilling the workers. In deep mines it is the best, but in shallow mines the fan is more powerful for obvious reasons. The author observes, "Should any accident happen to the fan or engine driving it, the position of affairs would be lamentably unfortunate," and the mere fact of increasing its velocity on any emergency may determine a breakdown. There is not this risk with the furnace. The most useful part of the chapter on ventilation is that referring to the calculations necessary to be made to insure the due amount of rarefaction or the difference of the weight of the two columns of air in the downcast and upcast shafts. In order to assist in these calculations a table is given which gives the weight of any column of air in either shaft at different temperatures, and barometrical pressures. Gases expand 1-459th of their volume for every degree of Fahr.; but, it is explained, "it is necessary to remember that the starting points in the calculation of the expansion of any given volume of air must always be taken from 0 on Fahrenheit's scale, as it is air at that temperature that expands the 1-459 part of its volume. Thus 459 cubic feet of air, measured at 32° F., will not expand to 460ft., because 459ft. will have expanded 1ft. for every degree of difference between 0° and 32°, and will therefore be 459 + 32 = 491 cubic feet." In practice, when ventilation is produced by furnace action, the air in the upcast shaft is maintained at 200 F. or more, and it is worth mentioning, that the relative diameters of the shafts have nothing to do with the total pressure of the atmosphere as regards ventilation, for the weight of column in each shaft is estimated, not by the total number of cubic feet, but simply by the depth in feet or the number of cubic feet in the depth of shaft. Of course, in calculating the pressure, the loss by friction against the side of downcast shafts has to be considered, and a separate chapter is devoted to this point. In all cases the rubbing surface is found by adding each of the sides of the airway. Thus an airway 6 × 4, exposes 20ft. of rubbing surface per foot run. A coefficient of friction has not yet been satisfactorily determined, though Atkinson puts it at ·26881 for air travelling 1,100ft. per minute. An appendix on "After Damp" or explosions, and much useful data are given.

* A Treatise on Coal, Mine Gases, and Ventilation. By J. W. Thomas, F.C.S., &c. London: Longman, Green, and Co.

THE SOUTH PASS JETTIES OF THE MISSISSIPPI RIVER.

IN a recent number of the American Society of Civil Engineers' transactions some notes on the South Pass jetties are given by Mr. E. L. Corthell. A few years ago a vessel drawing 7ft. had great difficulty in passing over this long flat bar of mud and sand, whereas now, for uniformity, depth, and navigability, the channel is said to be as good as the Sandy Hook entrance to New York Harbour. We may just explain that these jetties are based upon the value of forming an artificial confinement or channel for a river current. They have, Mr. Corthell says, under the most unfavourable circumstances, caused a scour instead of a deposit in front of them. The paper and charts before us show at least the effect of well-located jetties. In one of the maps appended the alignment of the jetties is shown, the width between the guide piles is 1,000ft., and the clear width between the jetties 930ft. Wing dams at right-angles are shown at intervals, intended to compel the currents to make the deep channel midway between the jetties, and also to induce deposits behind them and against the jetties, and to hasten erosion of bar. The wing dams are removable. To expedite the erosion the first mile of east jetty is built of sheet piling after a foundation of mattresses had been laid. These mattresses are built of willows obtained from an extensive swamp 25 miles from Port Eads. They are put together on inclined timber ways and then launched, interesting particulars of which are given by the author. The mattresses are about 100ft. long. They float about 4in. out of water. Stones are spread over the mattress until it sinks, when another mattress is placed upon it, and another, and so on till the surface of water is reached, when the last is pulled on at high tide. The permanent jetties are built entirely of mattresses in this way after the provisional work was done. The foundation mattress is about 40ft. wide, and the last 20ft. to 25ft. It was not found necessary to have any slope seaward, as the deposit is so rapid. A wider base and sea slope are, however, given to the sea ends of jetties, to protect them from the violence of the waves, and this work is not yet completed, being done as opportunity offers. The instrumental and hydrographic details of the work are minutely described. Some idea of this work may be gleaned from the fact that each month "a complete hydrographic survey, covering an area of 13,000,000 square feet, and a mean depth of 20ft., is made in four days, and plotted in another day." The surveys are shown in the charts before us, on which are plotted the position of the numerous bars and soundings—the latter expressed in feet and tenths, and these refer to a plane of reference—the average flood tide as established by the Secretary of War of the U.S. Engineers. One of the remarkable results to be observed in this chart is the increase of depth between the jetties and the changes of the contours of the shoaling from May, 1875, to April, 1878. These show an increase of depth of 15 feet at the shoalest part, with considerably greater depths in other points. At the sea-side of jetties the shoaling is as much as to give only two feet of water where before there was 16 feet, and this shoaling has also protected the jetties on the river side. At the ends the jetties are being loaded with rubble stone to further protect them from the action of waves, and it is believed that when finished, according to the plans, they will be amply strong to resist any wave force.

The importance of the subject of river deepening of the Mississippi passes becomes of greater interest to us now that the question of the shoaling of the Thames is before the public, and it may not be irrelevant to suggest a similar plan to increase the depth of this river. The experimental observations made and recorded in respect of the South Pass jetties; the power of eddies in scouring and depositing; the composition of the bars whether of sand or clay are valuable to any future undertaking of the kind. Some very curious phenomena are cited by the author, of much interest to those studying river changes, and a chart before us shows at a glance by curves the relations between velocity, discharge, sediment scour, and deposit. By this sketch the history of each characteristic curve is closely traced; thus we get the average location of 20, 24, 30, and 40 feet contours at the end of the jetties obtained by averaging 24 ordinates measured at intervals of 50 feet. These contour lines give the approximate position of the outer face of the bar at each of the dates given at the top of the chart, the ordinates being ruled at intervals. Sand and sediment curves show the ratio of sediment to water by weight; and the excess of scour over deposit is similarly shown in the jetty channel. By these contours the relation of the bars to the rise and fall of the river, the scour, and other causes are at once seen. Other charts and tables show changes in the gulf bottom beyond the end of jetties, and prove that in the two years and a half of work there has been an average increase in depth over the area scoured of 2,102ft. We have not space left to describe other works, such as the dykes and "sills" of mattresses undertaken to concentrate the flow of water into the South Pass by impeding the flow up other passes at their head. From the map and soundings we find, however, these artificial obstructions have already been productive of changes favourable to the channel, and a general shoaling has taken place in some of the side passes between the dykes and sills. In one case, it is said, the average shoaling has been about 1½ft. in

12 months. These experimental jetties and dykes in connection with the South Pass must prove of suggestive value to future works of river hydraulics, and their results in the future will be looked to with as much eagerness as their present reported success. The work has been one of thrilling interest; many discouragements and obstacles have beset the engineers and contractors in their thankless labours, but when completed the work will doubtless be looked upon as one of the greatest achievements in the engineering of river improvement.

RETAINING WALLS FOR WATER OR SEMI-FLUID EARTH.*

A VERY common engineering construction is the retaining or revetment wall; and curiously enough, it is from the military engineer that his civil *confrère* obtains many of the most important theoretical and practical points in this line. The theory of retaining walls has been the subject of the keenest and most abstruse mathematical analysis; but these investigations are, as a general thing, too technical for the average constructor to consult, and as to their results he is apt to ignore them and trust to the rule of thumb, or to custom. Of course, this being the case, we hear of some walls crushing or falling or sliding; and we know that others are prevented from doing so only because they have had excess of material squandered upon them. It is not, however, sure that if every wall were calculated accurately down to the finest point, before being built, there would be no accidents and no waste; because in no instance does the engineer know the *exact* value of any of his factors, especially as regards the weight and strength of his materials. Thus, theoretically, a cubic yard of "solid" sand weighs 112½lb., and the same sand "loose," 95lb. only; but just what "sand" is and how tightly packed "solid" means, who shall decide, or who could tell, if there were an actual standard? And in how many actual cases are the elements of the problem free from uncertainty and disturbing influences? Blind luck often aids the builder. The most celebrated American civil engineer, Mr. John C. Trautwine, once said to the writer, who called his attention to a 9in. brick wall supporting a four-story warehouse with floors loaded with paper: "Now, if an engineer had built that wall, it would have fallen in a month; but as an ignoramus ran it up, it has stood these forty years under circumstances where, by all the laws of strength of material, &c., *it could not possibly stand a minute.*"

Just why a wall fails is not always attributable to insufficient strength (nor why it stands to proper construction). A wall built strong enough to hold in a bank, if the drainage be good and the bank all right, may, with improper drainage and bad backing, or improper section of the wall, soon come down. In designing a wall, it is generally assumed that it is to support dry material (or at least one not water-permeated); that the material shall not slide against it, and that the wall shall be well built of good materials. Sometimes a wall will stand for years, and then give way when there is put upon it a maximum pressure, or when its material has rotted.

Where a wall has to resist simple water-pressure, it is not exactly a "retaining wall;" but very often infiltration through a bank makes it necessary to calculate the wall to stand full hydrostatic pressure. This is found, for any portion of its length, by multiplying the area of the surface by the depth of its centre of gravity below the water-level, and by the weight of a unit of water. But leverage also comes into play, as there is an *overturning* force as well as one tending to slide the wall bodily. When the top of the wall is at the water-level, the total distributed pressure may be said to be equal to the same force acting at a point ⅓rd from the bottom; and we must multiply the lateral pressure by this height from the bottom, to get the *overturning* force. Thus, a wall 12ft. high has on every foot of length $12 \times 6 \times 62\frac{1}{2} = 4{,}500$lb. *lateral* pressure; and the *overturning* force is $4{,}500 \times 4 = 18{,}000$lb. on each running foot. This overturning force must be resisted. As the outer line of the foot of the wall is the turning-point, the wall has an advantage of leverage over the water, this leverage being the horizontal distance of its centre of gravity from the turning-point. If the wall be of equal thickness throughout its height, this centre of gravity is in the middle of the thickness; and the amount of the wall's resistance per running foot will be equal to the number of cubic feet in a running foot, times its weight per cubic foot, times half its thickness.

Thus, if one 12ft.-high wall be 6ft. thick, and of brick weighing, say, 120lb. per cubic foot, we have as its resistance $72 \times 120 \times 3 = 25{,}920$lb., as against the 18,000lb. overturning force. If the wall were 5ft. thick, its resistance would be $60 \times 120 \times 2\frac{1}{2} = 18{,}000$lb.—or just enough. To calculate the exact thickness to fulfill the conditions of simple stability, multiply the weight of water (or mud) per cubic foot by the square of the height; divide by three times the weight of the masonry per cubic foot, and extract the square root.

In addition to the mere weight of the wall, it has a resistance given by cohesion; this may be counted as about 7,000lb. per square foot of base, if founded on rock or concrete.

Of course, a rectangular wall section would not be generally practical; and we must allow a large "margin of safety" to cover poor work and material.

A good proportion of section for a wall designed to retain water or semi-fluid earth is—

	The height.
Top thickness	0·3
Middle thickness	0·5
Bottom thickness	0·7

This would make our 12ft. wall 8·4ft. at base, 3·6ft. at top.

For the support of dry earth the problem is less simple. The engineer must exercise his judgment as to what "angle of repose" or "natural slope" of his materials he will base his calculations upon; and even with this element determined, the formulæ are more complicated than in the simple case we have just considered.

* From the *Polytechnic Review*.

IRON ROOF CONSTRUCTION.

A VERY practical and useful paper on iron-roof construction was read on Thursday week before the Leeds Architectural Association by Mr. T. Gillott, of the Farnley Iron Works. The chair was occupied by Mr. George Corson, one of the vice-presidents for the present session. The lecturer, who illustrated his subject with a number of diagrams, treated the various forms of triangular roof trusses in general use, entering into detail of the weights of metal required for different spans, and the approximate prices for the same. A comparison was drawn between roof trusses composed altogether of iron and those combined of iron and timber, in which the rafters and struts are composed of wood for economical reasons. With regard to the economical proportions of triangular roofs, it was stated that the greater the rise or angle of inclination of the rafter the greater would be the area, weight, and consequently cost of covering; but the weight and cost of the trusses varied approximately as the square of the span and inversely as the rise or pitch. The cost of the material in principal and covering would influence the pitch—namely, glass, zinc, &c., required a lower pitch than slates and tiles. The following forms of arched roofs were described:—1st, those in which the horizontal thrust is provided for; 2nd, plain ribs depending upon their own stiffness to prevent the haunches spreading; 3rd, plain tied arches; 4th, trussed principals. The roofs to the Derby Market-hall and King's Cross-station were mentioned as examples of the first order. Those of the second order, the lecturer stated, were not to be recommended. The roofs constructed after the manner of the third order were to be seen at the St. Pancras Station and the Derby Drill-hall, where the lattice ribs spring from the floor, and are tied across underneath. Among examples of the fourth order, those of trussed principals, the roof of Amsterdam station, designed by Mr. Ordish, was quoted, where the arch is a cast-iron tube 8ft. in diameter and 30ft. rise, and the span 120ft. In conclusion, the lecturer remarked that the combination of dissimilar materials could not be recommended. Cast-iron, although well adapted for short columns, was not for long roof struts.

THE "MURALIS" DECORATION.

THE demand for a wall covering, at once artistic, durable, and moderate in price, has led of late to many substitutes for paper. Stained and painted wood, veneers, sgraffito, embossed leather, tapestry, and tiles have been of late introduced as revivals of old arts, but we must confess that for ordinary purposes of decoration they are beyond the reach of most people. Messrs. Frederick Walton and Co., of 9, Berners-street, Oxford-street, have introduced of late a material that fulfils the above conditions, and as far as we can judge is, if not indestructible, very durable. It can further be readily cleansed with soap and water—no undesirable merit in a sanitary point of view. The "muralis," or "Sunbury wall decoration," as it is called, is, as we have before stated, a species of linoleum, or a thick fabric of linseed oil and fibre rolled upon a cloth and impressed with patterns in low relief. Its natural colour is that of linoleum, and it may be made in various pleasing shades of buff or brown. Having been invited to see a room in which the "muralis" has been applied we can speak with more confidence of the material. Our first idea was that the smell of the oily ingredients of which it is composed would be disagreeable, but we find no unpleasant effect on this ground to complain of. The room we visited was covered with the "muralis" in panels of different patterns—a dado of a small upright channelled pattern in relief, and of a pleasing chocolate colour, surrounding the room. Some of the panels exhibit the material as manufactured of its natural tint—a light buff or cinnamon—and others showed the effect of colour to relieve and bring out the pattern, which, of course, is a matter of taste. We confess a decided preference for the plain stamped material in its light or darker shades, or those of a delicate sage green or olive grey tints that can be produced in the manufacture. We believe wall decoration of this kind should not usurp the place of painting, wood carving, or modelling, however near it may approach, and therefore it seems to us desirable to confine the colour to two or three shades, as for example making the relievo parts of a different tint to the ground—a treatment, we believe, Messrs. Walton contemplate. For similar reasons we think all stamped ornament should be as flat and conventional as possible, and the patterns we saw agree with this principle, though the clearness and precision of the ornamentation are everything that can be desired, and the patterns may further, it is said, be tooled after the stamping. The "muralis," as exhibited at Messrs. Walton's showroom, indeed exhibits as clear and delicate an impression as if it were stamped plaster or carved wood, though we consider the idea of embossed leather, which it strongly resembles in its natural state, the right one. It has no unpleasant glaze, and we believe that for dados, halls, and staircases the material will be found excellently adapted. Its toughness and indestructibility were shown by striking a piece with an iron hammer, which left no indentation, and we understand, what is of even more importance, it is impermeable to moisture, so that it may be fixed on damp walls. Unlike Parian cement and tiles it is not subject to the presence of condensed moisture; we understand it can be fixed either with strong glue or paste to the wall surface. We think its introduction in panels is a good mode. Being elastic it can be bent round corners and coves of cornices. As respects cost, the wall "muralis" is usually 20in. wide, and sold for 2s. 8d. a yard; the dado is sold of 23in. wide at about 3s. per yard, the ordinary charge per square foot being 7d. These prices are for the plain material, and a small room may be provided with a dado of a suitable stamped pattern of oak colour for two guineas.

The foundation stone of new almshouses, founded by Lord Richie in 1565, at Fel-stead, Essex, was laid on the 9th inst. Mr. Chancellor, of Chelmsford, is the architect, and Mr. James Brown the contractor.

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ILLUSTRATIONS.

ST. MARGARET'S CHURCH, LEE, KENT—A COURTYARD AT ABBEVILLE—MAISON DE DIANE DE POITIERS, ROUEN—"BUILDING NEWS" CLUB DESIGN FOR VILLA—DETAILS OF THE NEW NATURAL HISTORY MUSEUM.

OUR LITHOGRAPHIC ILLUSTRATIONS.

COURTYARD AT ABBEVILLE.

The courtyard of this house, of which we give an illustration this week, from Mr. C. H. Rew's drawing, exhibited this year at the Royal Academy, is situated on the north side of the Rue de la Tannerie. It is one of several examples of timber houses in different parts of the town, but is perhaps the best of them, being larger and more free from restoration. A great part of the detail of the woodwork (especially the staircase enclosure) is as perfect as when it was first carved. The street front is of the same design as that shown on the left-hand side in our illustration.

MAISON DE DIANE DE POITIERS, ROUEN.

This interesting old front is situated at the intersection of the Rue aux Ours with the Rue Jeanne d'Arc, near the tower of the demolished Church of St. André. It is supposed to have once formed the façade of a house in the Rue de la Grosse Horloge, which was reputed to have been formerly the residence of Diana of Poitiers, the celebrated mistress of Henry II. of France. The front is composed entirely of oak, and is covered with ornament, partly incised, but principally in bas-relief, and its age has imparted a dark rich tone to this excellent example of the domestic architecture of the time. The drawing was made from sketches taken at Rouen in the summer of '77, and was exhibited in this year's Academy.

"BUILDING NEWS" DESIGNING CLUB.—A VILLA.

We have already published * the design placed first for the villa residence to be erected at a cost of not more than £1,200. To-day we give the design to which we awarded the second place. Like the other design it is not free, of course, from some few minor objections, but generally, as we said when reviewing the designs, much care and compactness of planning has been observed by the author, who signs himself "Sunflower."

NEW NATURAL HISTORY MUSEUM, SOUTH KENSINGTON.

Continuing our detailed drawings from this important work we devote a sheet to-day to the illustration of the staircase at the north end of the large hall, or Index Museum, as it is called. We have already published the details of the upper portion of this end of the hall in the Building News for Oct. 25th last, and by reference the connection between the drawing then published and that which we give to-day will at once be seen. The half elevation herewith shows the staircase to be of a T-shape in plan, the stairs commencing in the centre, and then branching off on either hand to the right and left galleries of the Index Museum. The first flight is also shown by the section, while the several details, both of the panels and balustrade, are fully shown from drawings made on the spot since the work has been executed. The caps to the shafts of the balustrade are of two varieties, but the shafts themselves are of six different patterns, all of which we give, the plain shaft being one of them. The pateras are various, and of these we give four examples. Shortly we shall be enabled to give a perspective view of the building with a corrected general plan of the principal floor. Other details also will follow, including the general and detailed elevation of the main entrance. Mr. Alfred Waterhouse, A.R.A., is the architect.

CHURCH OF ST. MARGARET, LEE, S.E.

This church was built about the year 1839 or 1840, from designs of Mr. Brown, architect, of Norwich, Mr. E. Christian being the clerk of the works, and under his direction all the works were carried out. We may here observe that not only are the materials the very best, but the workmanship is also equally good. At the time this church was designed mediæval architecture was less understood than now, and for its time it may be considered a great advance in ecclesiastical architecture. The church was designed with nave without clerestory, north and south aisles with gable roofs, and large Early English windows. The chancel had aisles—one used for a vestry, the other for the organ; and chancel and chancel aisles had plaster-groined ceilings. The recent alterations in this church are numerous. All the galleries have been removed, the two eastern entrances, with the east wall, been taken down, and the chancel and chancel aisles have been extended some 20ft. further eastward, the plaster groining taken down, and stone groining taking its place. In the place of the two eastern entrances two others have been made in the last bay of the nave. The western gallery having been removed, a new and lofty arch has been built to open out the western tower, and is now used as the baptistery. All the pews have been removed, and in their place oak benches have been put, the passages in nave and aisles laid with Minton's tiles, and the floor under benches with wood blocks. In the north chancel aisle the organ has been built on a platform, the space underneath being arranged for chairs. The chancel is now fitted with stalls, and the tile paving is rich in colour and varied in design; the chancel has three bays of groining, the easternmost one being only about one-half the length of the other two bays—this gives variety, and is pleasing in effect. The three east windows are new, the one in the chancel being filled with stained glass. A reredos given by Mr. Tait, once an architect, has been published previously in this journal. Under the whole of the church vaults were built for the purposes of burial, but owing to an Act of Parliament passed shortly after the church was opened, not more than three or four have been used. Advantage has been taken of the vaults to make a priest and choir vestry, and a large parish room. The vestries communicate with the church by a stone staircase, and entrance to the vestry from the outside has also been provided. At some future time the present plaster ceiling to nave and aisles will be removed, and wood groining will take its place. These alterations have been done under the direction and from designs prepared by Mr. Brooks, architect, Wellington-street, Strand.

* On November 1st—vide pp. 448 and 461 in same issue.

ARCHÆOLOGICAL.

Archæology in Northamptonshire.—Excavations have been going on since June in the Roman Camp at Irchester, near Wellingborough, and have just been discontinued for the winter. They have been carried on by a committee of the County Antiquarian Society, under the direction of the Rev. R. S. Baker. The remains of the massive stone wall of the camp, inclosing about 20 acres, have been found underground, and traced throughout almost their entire circuit. Portions of two of the four original gateways have come to light. Within the camp a network of houses and other buildings has been disclosed in the portion explored by the diggers. Among these foundations are the remains of two circular buildings. Causeways over causeways and walls built on still older walls, and also the series of coins found disclose the fact that the camp became a town, and continued so during the whole Roman occupation of Britain. A large capital and portions of columns and other architectural stones and the trunk of a well-carved statue in stone have been dug up. The camp is considered to be one of the frontier forts erected by Ostorius about A.D. 48. Digging will be recommenced next year in this or another Ostorian camp lower down the Nene. The London and North-Western Railway Company are about to commence excavating the site of the historic Castle of Northampton for a new railway station. Only a few portions of the castle wall remain above ground, but many matters of interest are expected to be disclosed in the course of the removal of the ground on which the castle stood. A sub-committee has been appointed to note the progress of the excavations.

Swiss Lake Dwellings.—The remains of another lake village have just been brought to light at Lorcas by the shrinkage of the waters of the lake of Bienne. The station at Lorcas, assigned to the age of stone, is a short distance from the lake shore, not far from another and similar station which was explored in 1873. An exploration, conducted by Dr. Gross, of Neuveville, has resulted in the gathering of many novel and interesting objects, pierced stone hatchets, similar to those found in Denmark, large flint lance heads, jade hatchets, with staghorn and wooden hafts fastened with pitch; vessels in wood, among others a colander and a vase in a good state of preservation. Near these were found several arms and instruments of pure copper, a circumstance which points to the probability that intermediate between the age of bronze and the age of stone was a period when prehistoric man had not discovered the art of alloying copper with tin. This was the age of copper. Still more remarkable is a find of human skulls which bear unmistakable marks of having been trepanned. Round pieces have been cut out, doubtless after death, as is supposed, for use as amulets. In some instances pieces were cut from the craniums of living infants in order, as M. Broca, an eminent authority, conjectures, to let out the spirit by whose malignant influence they were afflicted with fits, convulsions, and other maladies. These bits of infants' skulls were sometimes used in a way of which an example has been found at Lorcas; they were put inside the heads of the dead to protect them from the wiles and assaults of evil beings in the world of spirits. A similar custom formerly prevailed among the American Indians of Michigan, and trepanned skulls have been met with in the sepulchral caves and dolmens of the South of France, but the specimen at Lorcas is the first that has been found in a lacustrine station. Skull amulets have also been found in Sweden, in Germany, and Austria.

Preparations are being made for lighting up part of the Liverpool-street station of the Great Eastern Railway by six electric lights, each of 800 candles, in connection with the Farmer-Wallace machine. The undertaking is in the hands of Messrs. W. Ladd and Co., of Beak-street, Regent-street, who arranged the trial at Messrs. Wells and Co.'s, Shoreditch. The light will be enclosed in plate lamps of clear glass, which are estimated to intercept about 10 per cent. of the illuminating power, and each light will be placed at an elevation of 20ft., so as to illuminate two of the passenger platforms.

The east window of Redruth Church, Cornwall, is about to be filled with stained glass as a memorial of the late Rev. J. W. Hawkesley.

The Littlehampton Local Board have decided to continue the well-bore for water. A depth of 500ft. has been sunk in the chalk without yielding signs of water. The contractor for the work already done, which has cost £1,800, was Mr. Hayter.

The memorial stone of a new Wesleyan chapel was laid at Gresford, Denbighshire, on Wednesday week. It will be Early English in style, and will consist of nave, 38ft. 6in. by 30ft.; transepts, 42ft. across by 20ft. wide; chancel, 15ft. by 13ft. 6in.; and vestry, 10ft. 6in. by 7ft. 6in. Accommodation will be provided for 240, but only the nave will be seated at present for 120. The seats will be of pine, with framed and panelled ends. The roof will be open, and of pitch-pine covered with Carnarvon slates, and red-tile cresting. Mr. A. C. Baugh, of Wrexham, is the honorary architect; Mr. Rogers, of Rossett, is the builder; and Messrs. Hughes and Owen, sub-contractors for masonry and walling.

The action for libel brought by Mr. Whistler against Mr. Ruskin was set down for hearing in the Court of Common Pleas on Monday last, but was adjourned for a week. The best friends of both gentlemen would rejoice to hear it has been abandoned altogether.

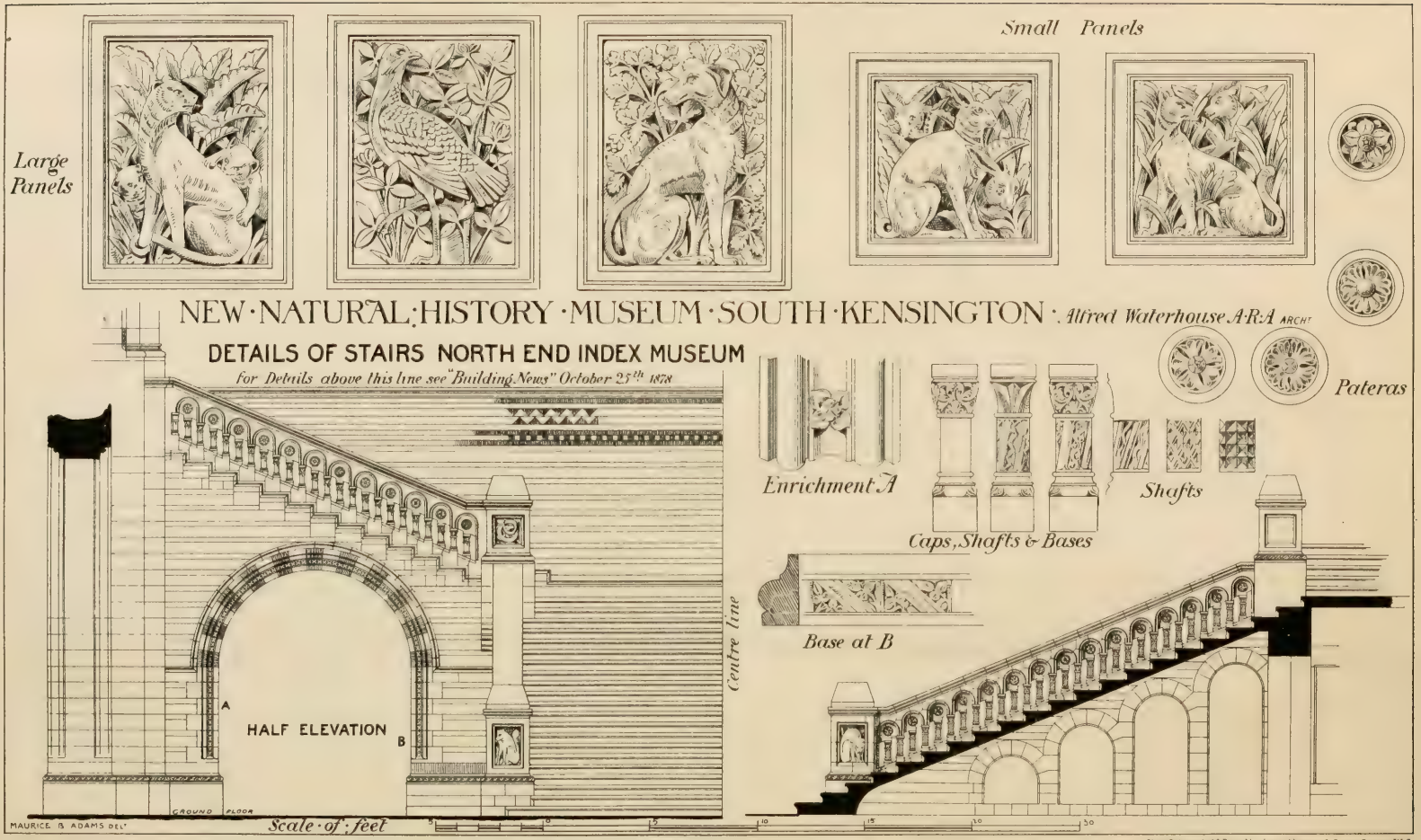


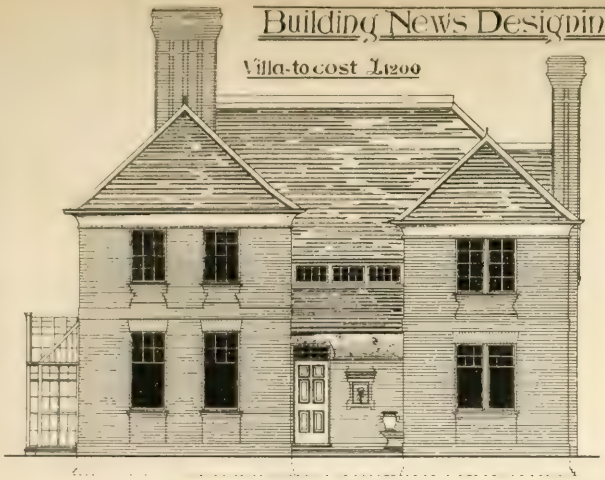
Photo Lithographed & Printed by James Akerman 6 Queen Square W.C.

Building News Designing Club.

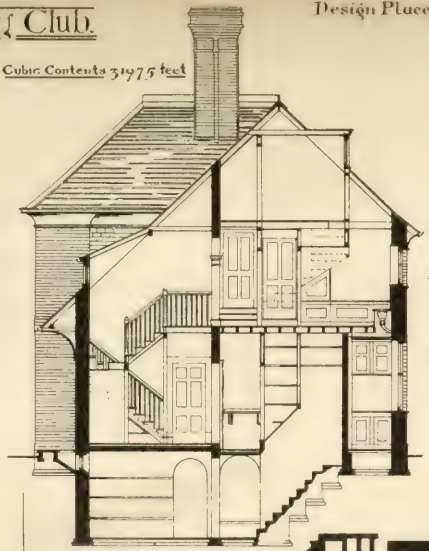
Design Placed SECOND.

Villa to cost £1200

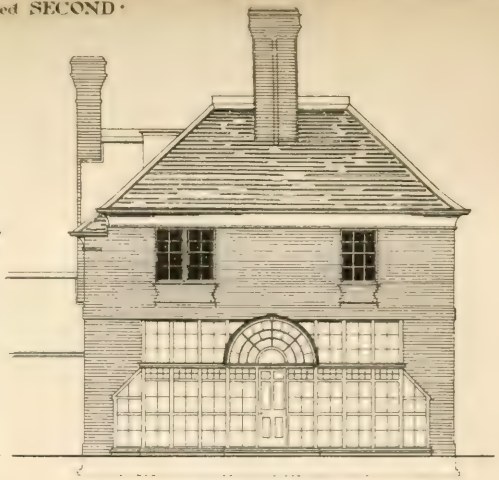
Cubic Contents 31975 feet



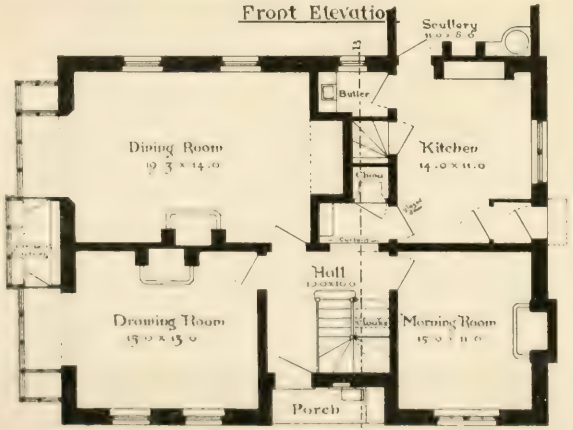
Front Elevation



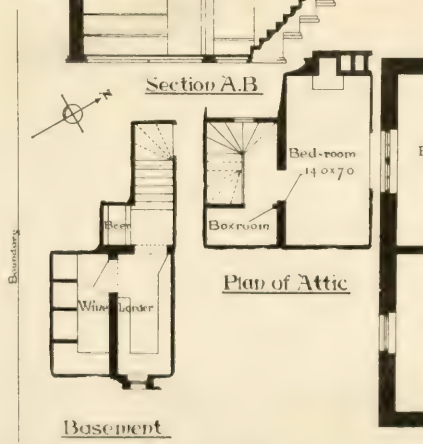
Section A.B



Side Elevation

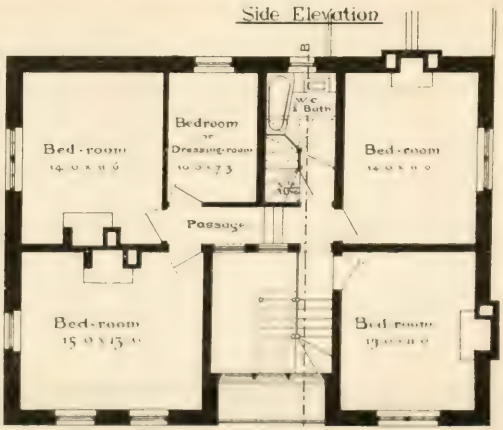


Ground Plan



Plan of Attic

Basement



Chamber Plan

Sunflower

OUR COMMONPLACE COLUMN.

ENAMELS.

Enamel is "a mixed material, fused and vitrified by the action of fire, and applied to the decoration of any substance—metal, stone, earthenware, or even glass." The metallic oxides give the required colours. Enamels are either opaque or transparent; opacity is obtained by adding a certain quantity of oxide of tin. A similar mode of decoration was used by the Egyptians, but they do not appear to have known the process of fusing the several parts. The western nations of Europe carried the art of enamelling to very high perfection from the eighth or ninth up to the sixteenth century. Cloisonné enamels are generally small, and extremely rare and valuable. Champlevé enamels are not uncommon. All kinds of articles—domestic, military, and ecclesiastical—were so ornamented. The chief seat of manufacture was Limoges, and the work of that town is still much sought after. Translucent enamels upon relief were made by Italian artists about the year 1300, and grew more perfect up to the 16th century. For many interesting particulars see South Kensington "Art Handbooks"—The Industrial Arts, page 51, *et seq.* — C. P. EDWARDS.

EUSTYLE,

(Gr. ευ, well; and στυλος, a column), an intercolumniation of two diameters and a quarter. The other terms denoting intercolumniation are pycnostyle (a space of one and a half diameters), systyle (two diameters), diastyle (three diameters), araeostyle (four diameters). Eustyle means the most pleasing arrangement, but it is evident this quality will depend on other circumstances than that of intercolumniation—such as the point of view from which the columns are seen, the nature of the composition, and other matters. The arbitrary limitation then of 2¼ diameters as the intercolumnar space is certainly absurd, and the same remark may be applied to the other terms above-mentioned, to which Vitruvius, in like manner, has assigned a certain space. The Greek words themselves undoubtedly refer, as their prefixes indicate, to denote generally the kind of composition—such, for example, in pycnostyle and araeostyle—as *pycnos* signifies dense, meaning a thick set row of columns; while *araeos* signifies rare or weak, meaning a wide spacing of columns.

EVANGELISTS.

The earliest representations are the four streams of Paradise, also four scrolls. In mediæval buildings they are frequently sculptured in relief with their emblems beside them. Thus, in the western doorway of Santiago Cathedral, the Puerta de la Gloria, the figure of Our Lord occupies the central space in the pediment, around whom are the four Evangelists, SS. Mark, Luke, and John, each being accompanied with his emblem, whilst that of St. Matthew is omitted. M. V.-le-Duc, speaking of this subject, says:—"The four Evangelists—SS. Luke, Matthew, John, and Mark—have been from the first centuries of the middle ages represented either under the form of figures of men draped, holding a book, or by four symbolical figures—St. Luke by the ox, St. Matthew by a man, St. John by the eagle, and St. Mark by the lion. Sometimes the personage and emblem are found together, and even the Evangelists have the bodies of men with the heads of an ox, man, eagle, and lion. The sculptors and painters of the middle ages have also represented the four Evangelists sitting or standing upon the shoulders of the four great prophets of the Ancient Testament. In the northern doorway of the Cathedral of Bamberg some fine sculptures of the 12th century show us the four Evangelists thus placed. At Bamberg the Evangelist holds a scroll (*volumen*), and is standing upon the shoulders of the prophet, to whom the artist has given the pose of an equilibraist; the prophet turns his face from the side of the Evangelist, the latter is nimbed. A dove (the Holy Spirit), placed on the capital, carries a phylactery in his beak. The stained glass of the southern transept of the Cathedral of Chartres has preserved to us, in painting, the same subject, but at Chartres the Evangelists are sitting on the shoulders of the Prophets. In this window St. Jeremiah bears St. Luke, Isaiah St. Matthew, Ezekiel St. John, Daniel St. Mark. The place, says M. Didron, that these attributes and the Evangelists ought to occupy is in an ascending line from bottom to top—thus, the ox, the lion, the eagle, the angel (man). These four figures are winged. In Greek iconography they have four wings, but in mediæval sculptures in France they possess only two."—C. F. W.

EXCHANGE,

A building or place set apart for merchants to transact their business. It usually consists of a central area, roofed or open, with stands for the merchants. Of typical buildings of this class we refer the reader to the Exchange buildings at Liverpool, designed by Mr. J. A. Picton, and remodelled by Mr. Thos. H. Wyatt, of London. The central area, 100ft. by 98ft., is divided into three avenues by iron columns, the centre one having a ribbed roof. There are 170 stands. The Stock Exchange, near the Royal Exchange, rebuilt in 1854 by Mr. Thomas Allason, is in the form of a Greek cross, with a dome of timber in the centre, and will hold 1,200. The Corn Exchange, in Mark-lane, is the largest of the kind in the world, and each factor has a desk for his samples. The Coal Exchange was designed by the late Mr. J. B. Bunning, and comprises several floors of offices round a centre hall, 60ft. diameter, constructed of iron. The leading building in London is the Royal Exchange, designed by the late Sir W. Tite, a description of which is unnecessary here. Its external size is 308ft. by 119ft. at one end and 175ft. at the other; there is an inner uncovered court, 111ft. by 53ft., with surrounding arcades. Three sides let as shops. Of Continental exchanges we may name the Bourse of Paris, a building of much excellence in plan. It is a parallelogram, surrounded by a peristyle of the Corinthian order, which forms a gallery. In the centre is the great hall (*Salle de la Bourse*), 116ft. by 76ft., capable of holding 2,000, and the roof is of iron and copper. At the east end is a circular space railed off for the *agens de change*, and the sides are appropriated to the different apartments. The Exchange at Amsterdam is also an important building of the class.

FAN-VAULTING.

A species of vaulting developed in Late Perpendicular, in which the ribs radiate at equal distances round a conical pendentive, and produce a fanlike appearance. The pendentive in this method of vaulting is no longer square on plan, but circular—in fact, it becomes an inverted cone with curved sides. The first step towards fan-vaulting may be seen at Canterbury, in which the pendentive is polygonal, the ribs being at angles. A easy transition from this form produced the circular, conoidal, or fan pendentive. At the crossing (Winchester Cathedral) the developed fan form may be seen. The four quarter pendentives leave in the centre a lozenge-shape opening, which is filled in with voussoirs and ribbed in the form of stars. Such a vault became more ornamental than constructive, the ribs form no part of the real construction, but are simply carved out of of the voussoirs. The four-centred arch was chiefly used in the cross section of fan vaults. (For further information we refer the reader to Prof. Willis's treatise on vaulting and to Viollet-le-Duc.) *Examples:* The roofs of King's College Chapel, Cambridge, and Henry VII.'s Chapel, Westminster, and St. George's Chapel, Windsor, are the principal examples of fan vaults, though minor illustrations of it occur in all late chantry chapels and tombs. The fan is a peculiarly English form of vaulting.

FEEDING HOUSE.

A feeding-house, in agricultural buildings, is a shed, usually from 18ft. to 30ft. wide, set apart for feeding stock, and in easy communication with the stores and food-preparing house. The best plan is to place the latter in immediate proximity by means of a tramway which is generally made to run between the cattle-stalls or behind them. The food-preparing house should contain a steaming apparatus, a root-cutter, cake and meal bins, with chaff and mill-rooms above, where the chaff-cutter, cake and corn mills are placed. The feeding-house should be well drained into proper tanks, and be well lighted, and also ventilated by open louvres or roof openings.

FELT.

As a covering to roofs asphalted felt is much used as a non-conductor of heat. The felt is laid on ¼in. or ⅜in. boarding stretched tight and overlapping at the joints of the sheets. It should be nailed with copper nails or clout nails heated and cooled in oil. In temporary buildings a coating of hot coal-tar and lime is put on the felt so laid, applied by a tar-mop, coarse sand is then sprinkled over it if there is no slating. For agricultural sheds, &c., the felt may be fixed to the rafters without boarding, the rafters being about 3in. × 1½in., and placed about 30in. apart. Battens may be used to prevent the felt bagging. In permanent roofs the felt is laid on boarding, and the battens are placed upon it, but some prefer to place the felt close to the slates and above the battens. Asphalted roofing felt is sold in sheets, about 25 yards by 32in. wide. It is about 3-16ths of an inch thick. Hurst says:—"In laying asphalted felt the joints should have a lap of 2in., and be nailed at intervals of 2in. or 2½in. with clout nails about ⅞in. long, weighing about 2¼lb. per 1,000. The nails should be dipped while hot in grease or oil. 1lb. of nails should be allowed to each square of roofing." The same authority recommends that felt on boarding should have a slope of at least 1 in 5, and for external purposes two coats of coal-tar mixed with dry pounded chalk or dead lime should be laid on hot, and sanded over with fine dry sand. This coating to the felt should be renewed every two years. Croggon's, Braby and Co.'s, Wulfert's, and other roofing felts, are used.

FEMERELL OR FUMERELL.

This is a sort of cupola or lantern in the ridge of an ancient hall-roof, and was used originally to let the smoke out of the hall when the fire was placed in the middle of it, and subsequently for ventilation. It was generally open or pierced at the sides, octagon in form, with a curved lead roof. Louvres frequently filled the sides. Examples may be seen on the college halls at Oxford and Cambridge. In recent times they are generally erected more for ornament than use. At the old Temple Hall (London) an interesting example is to be seen.

FERETORY.

(Lat., *Feretrum*, a bier), a tomb or shrine—a sort of parclose which inclosed the shrine or tomb, as in Henry VII.'s Chapel. Parker says "The term seems more properly to belong to the portable shrines in which the relics of saints were carried about in processions; but was also applied to the fixed shrines or tombs in which their bodies were deposited."

FIRE INSURANCE

The following rules are required by fire-offices: Brick walls should be carried through slated or tiled roofs, should have no openings in them, or they are classed with brick and timber buildings. Well-holes for staircases, light, and lifts are considered to increase risk. Windows looking into areas and common to other buildings are also considered objectionable. Houses with curb roofs and rooms in them are rated the same as brick and timber buildings. Gratings to public thoroughfares when they open into any room in the basement are regarded as dangerous. Contiguity to a manufactory or an inferior structure with openings overlooking the same is deemed hazardous. Among recommendations of the fire-offices are that the spaces behind register stoves should be filled up solid with brickwork; that flues should be properly pargetted with cow-dung mortar; that engine, furnace, and bake-house chimneys should be carried up outside the main walls of building, and be formed independently of walls; that fireplaces in carpenters' shops should have brick fenders, 2ft. 6in. high, with sliding iron door-shutter for fireplace when not in use; that pipe-stoves should stand on hearths of incombustible materials, 7in. thick; pipe-flues from close stoves should be of sheet, not cast iron, and be fixed 9in. clear of any woodwork; steam or hot-water pipes be 3in. clear of any woodwork, and brick-vaulted chambers should be provided for hot-water furnace and apparatus. Hot air is considered a greater risk.

METROPOLITAN BOARD OF WORKS.

At this board on Friday Sir Jas. McNaughten McGarel Hogg, Bart., K.C.B., M.P., was re-elected, for the ninth year in succession, chairman of the board, at the salary of £2,000 per annum. The seal of the board was affixed to a resolution declaring three areas in Wells-street, Poplar, Little Coram-street, St. Giles's, and St. Pancras, and Great Peter-street, Westminster, "unhealthy" within the meaning of the Artisans' Dwellings Act, 1875, and improvement schemes were ordered to be deposited in next session of Parliament. £200 was voted towards the cost of an improvement in St. John's churchyard, Waterloo-road, on condition that it be dedicated to the public for ever, and that the vestry keep the grounds in order. The works committee reported with reference to an application from Mr. Vulliamy requesting the board to reconsider his present salary, as superintending architect to the board, that having regard to Mr. Vulliamy's high professional standing, the value and length of his services, and the large increase which had undoubtedly taken place in his duties and responsibilities, that they were unanimously of opinion that he should receive a higher remuneration than at present, and they therefore recommended that his salary should be increased from £1,500 to £1,750 per annum. The report was adopted. The works committee further reported that they had had before them a letter from the vestry clerk of St. Luke's, Old-street, requesting the board to inspect and value the premises 87 to 91, Golden-lane, and adjoining premises as soon as possible; the committee had referred this to the architect to report on, as to the compensation paid by the vestry for Nos. 87 to 91, Golden-lane inclusive, and Nos. 3, 4, 5, and 6, Benbow's-rents adjoining, and from the report presented by the architect it appears that, in his judgment, the amount paid by the vestry—viz., £12,300—is excessive, and is no less than £4,270 beyond the sum which he considers should have been paid. The committee submitted the architect's report for the information of the board, and recommended that a letter, based on it, be sent to the vestry. Mr. Richardson, in moving the adoption of the report, alluded to the fact that the vestry of St. Luke's had passed a resolution expressing their unabated confidence in Mr. Storey, and said it now appeared that the vestry had paid to one of their members, for a freehold taken in the improvements, a sum of £4,270 in excess of what the superintending architect would have considered just. The whole proceedings were sadly calculated to damage the principle of local self-government. He trusted the board would not accede to the vestry's request for sanction to a further loan. The report was adopted. Letters from the solicitors to the London Tramways Company, giving notice of their intention to apply for Parliamentary powers to construct tramways in Waterloo-road, &c., and over Waterloo and Vauxhall bridges, was referred to the works committee for consideration. A letter was received from the Royal Institute of British Architects, stating that the council have granted certificates of competency to perform the duties of district surveyors to Mr. S. F. Clarkson, Mr. P. Cowper, Mr. W. Grellier, and Mr. W. Smallpeice.

THE MOUND BUILDERS' UNIT OF MEASURE.

Mr. J. W. McGill, who has been making a critical study of the artificial mounds of north-eastern Iowa and contiguous parts of Wisconsin and Minnesota, finds considerable evidence of the employment of a unit of measurement in their erection, the possession of which would prove the mound builders to be tolerably advanced towards civilisation when they entered the country. In the *American Journal of Science and Arts*, for October, Mr. McGill gives a large number of measurements made by him in one of the most extensive systems of mounds in north-eastern Iowa, and arrives at the conviction that the linear unit employed by the builders was simply, or had grown out of, the pace or yard. The northern limit of the mounds of definite dimensions is not certainly known. Mr. McGill has sought vainly for evidence of the use of measurements in the most northerly of the mounds. His own examinations so far extend only to latitude 43° 30′ N., and there the mounds are of constant or related dimensions. The most northerly of the measured mounds are undoubtedly within Minnesota. In conclusion, Mr. McGill observes that if we assume a slow southerly migration to have taken place in the mound-builders, it will explain the evident increase in geometrical knowledge attested by the various works found in crossing the United States from north to south. In the north-west we find measurements of simple lines, but not of angles or areas. In Ohio, angles were correctly measured, the squares being accurate squares, and the circles perfect circles; and areas were measured, as attested by adjoining squares and circles being equal or very nearly equal in area, though there is no satisfactory evidence that the cardinal points were then known. In the lower Missisippi region the cardinal points were known. The gradual modification in the various arms and implements, and the striking improvements in pottery, together with many other important considerations, lend support to this view.

CHIPS.

On Saturday the foundation stones of a new Primitive Methodist chapel were laid in Skipton. The chapel and chapel-keeper's house will have a frontage to Gargrave-road, and will cost something like £4,000. The chapel is to be in the Italian style, and will seat over 600 persons. Mr. Thos. Howdill, of Leeds, is the architect.

The foundation stone of a new vicarage has been laid at Llanthangel-Rhydithon, Radnorshire. The estimated cost will be somewhat under £3,000. The architect is Mr. Charles Fowler, 7, Upper Woburn-place, London, W.C., and the tender of Messrs. Everall and Morris, of Shrewsbury, has been accepted for the work.

It is proposed to isolate the house at Nice in which Garibaldi was born. Besides the ornamentation which is designed for the exterior of the house, there will be produced in mosaic, and placed on the walls of the chief room, a portrait of the general and the battles in which he took part, from Monte Video to Dijon. The mosaics will be copied from paintings in oil by distinguished artists, and their execution will be entrusted to the well-known mosaicist of Ravenna, Signor Francesco Badessi.

On Saturday an application was made to Mr. Registrar Hazlitt, sitting as chief judge in the London Bankruptcy Court, for the appointment of a receiver to the estate of Edward George Chapman, of Effra Villa, Effra-road, Brixton, builder and contractor, who has petitioned the court for the liquidation of his affairs, stating his debts at £100,000, of which the larger portion is secure. The assets, as at present estimated, are valued at £10,000. Upon the application of Mr. Louis Burnett, his Honour appointed Mr. Buckland, Bishopsgate-street, receiver of the estate, and restrained several suing creditors for a week.

On Thursday week was laid the foundation stone of a new Welsh Wesleyan chapel at Aberystwith. The new chapel will seat between 800 and 900 persons, will measure internally 72ft. 6in. by 40ft., and will be 32ft. high. The principal elevation to Great Darkgate-street will be in the Corinthian style. The whole of the work is being executed by Mr. Thomas Jones, builder, Dole, at a cost of £2,550, from the plans and under the superintendence of Mr. Walter W. Thomas, architect, of Liverpool, and Aberystwith.

The memorial stones of a new Wesleyan chapel were laid at Poole on Nov. 7. The new chapel will seat 950 persons, and will be in the Gothic style, built of Swanage rag and Bath stone. There will be a tower and spire at the angle of Chapel-lane, rising about 100ft., with entrances in the base of it to the chapel, and similar ones on the other side. The architect is Mr. Charles Bell, of London, and the builder Mr. S. Clarke, of Parkstone, Poole, whose contract is about £4,000.

In our account last week of the new bridge erected at Salford over the Irwell we should have stated that the whole of the masonry, excavations, &c., in abutments, foundations, and wing walls, were let to Messrs. A. Pilling and Son, contractors, of Bolton and Manchester. The ironwork only was let to Messrs. Bellhouse and Co., of Manchester. The separate contracts amount to about for abutments, &c., £1,700; ironwork, £12,000.

On Wednesday week the memorial stones of a new Wesleyan chapel and school-room at Acomb were laid. The new chapel will be in the Gothic style, 70ft. long, 32ft. wide, and about 18ft. high from the floor to the roof. The material used is red brick, relieved with blue string courses. The total cost will be about £1,600. Mr. C. Anderson, of Lendal, York, is the architect.

Building Intelligence.

Bradford.—A group of business premises, known as "The Swan Arcade," has been erected at Bradford from the designs of Messrs. Milnes and France, architects. There is an outer fringe of buildings of great height on all the four sides of the ground, enclosing a quadrangle wherein are placed two blocks of shops and offices, separated from each other and from the outer buildings by three glass-covered arcades or avenues running from east to west, and two avenues placed transversely. The shops or piece-rooms abutting upon each of these avenues are supplied with large plate-glass windows with ebonised mahogany framework, and the rooms above are intended as offices or market-rooms. The staircases leading to these upper rooms are laid with polished stone landings, the floors of the rooms are of marble and concrete, and the fittings are of polished pitch-pine. Light granite shafts divide the upper windows, which, like those upon the ground-floor, are fitted with ebonised mahogany sashes. All the avenues and floors in the lower rooms are laid with polished slabs of marble and cement of various colours, on Oppenheimer's principle. The entrance to the inner quadrangle from the three streets abovementioned is by means of four bold archways, each of which is furnished with a handsome pair of iron gates, so that the interior portion of the block can be closed when required. The walls of the arcade are built with cleansed ashlar, and the wall faces are being covered with tiles of various designs. Messrs. J. and W. Beanland, of Bradford, were the contractors. The cost of the work is about £100,000.

Brentwood.—The corner stone of the district church of St. Paul, at Bentley, South Weald, Essex, was laid on Saturday week. The church is Early English in style, and in consonance with the Essex type of the 13th century. It will seat 250 persons, and will consist of nave and south aisle, each 60ft., and chancel 30ft. long. At the east end of south aisle will be an organ-chamber, and in corresponding position on north side a tower, the ground floor of which will be fixed as vestry. Externally the walls will be faced with flints set at random, and dressings and quoins of Westwood stone. The tower will be capped by a broach spire, covered with oak shingles. The roof of nave and chancel will be of high pitch and tiled. In the interior Westwood stone will be used for the arcade, chancel-arch, and other stonework. The stalls, seats, and chancel ceiling (which will be panelled) will be of oak. The sacrarium and chancel will be paved with marble mosaic, and the nave with Menton's tiles disposed in patterns. It is intended, when the walls are thoroughly dried, to apply to them a complete system of decoration of a simple character suitable to a village church to the whole of the interior. Mr. Ernest G. Lee, of Bedford-row, is the architect; the builder is Mr. J. S. Hammond, of Romford. The cost is £8,000.

Carlisle.—Extensive business premises erected for Messrs. Carr and Co., biscuit manufacturers, fronting the new Viaduct and Blackfriars-street, Carlisle, were opened on Saturday week. The building is three stories high, and Late Stuart in style. The exterior walls are of Lazonby snaps stone. The main shop is 64ft. by 40ft.; the ceiling is of pitch pine, varnished; the walls are boarded, and the floor is of two thicknesses—the upper one being pitch pine; the windows and doors are of oak, oiled. A smaller shop adjoins, and behind is the biscuit-room, formed of glass, with oak framing and perforated iron floor. This room will be heated to 70° F. continually. On the first floor are general offices, private office, waiting-room, and at the rear of these stories is a flour warehouse, 56ft. by 40ft. The second floor is similarly divided. The whole of the premises are heated by the Climax boiler, which, with the circulating pipes, was fitted up by Mr. Corbett, of Carlisle. Tobin's system of ventilation is adopted. The architect is Mr. C. J. Ferguson, and the clerk of works Mr. Little; Messrs. Armstrong carried out the masonry contract, and Mr. Court that for joinery.

COVERSHAM.—Coversham parish church, lately restored under the direction of Mr. C. G. Wray, F.R.I.B.A., architect, of London, was reopened last week. The whole outlay has probably been about £3,000. The restoration has consisted in the whole of the north wall of the nave and chancel, together with the east wall of the chancel, being pulled down and rebuilt. The roof has been raised to its original pitch, and covered with Westmoreland slates; a new chancel arch has been inserted, and an organ chamber, with vestry, has been built at the north of the chancel. The whole of the church has been re-seated with open benches. The contractors are Messrs. Jones and Sons, of Leyburn.

DUBLIN.—The new Dublin Stock Exchange is completed, and will be opened shortly. The building has a frontage of about 100ft., and a depth of 70ft. The elevation is Italian, the ground floor front having rusticated pilasters, with bold frieze and cornice, and the entrances, two in number, having pilasters and jambs (monoliths of considerable size), arched openings, and keystones. The whole of this is in Ballyknocken granite. The upper portion of the facade is of Kilmarnock white fire brick, with granite window dressings, strings, and quorns, and the whole is surmounted by a cornice of Wicklow granite. The interior of the building is well planned, and the fittings throughout of a superior description. The whole was designed by Messrs. Millar and Symes, of Great Brunswick-street, Dublin, architects. The works have been carried out by Mr. George Moyers, of South Richmond-street, Dublin, the contractor.

EDINBURGH.—Plans for the erection of a new hospital for incurables were prepared some time since by Messrs. Peddie and Kinnear, architects, and operations have just been commenced. The building has a frontage of 160ft., and a depth of about 180ft. It consists of a centre block and two wings, the former being three stories and the latter two stories in height. Externally the building is treated in the Classic style of architecture. The architects' estimate for the erection of the building was about £9,000, and the contracts accepted for the work are considerably under that sum.

INCORPORATED CHURCH BUILDING SOCIETY.—The usual monthly meetings of the Incorporated Society for Promoting the Enlargement, Building, and Repairing of Churches and Chapels were resumed on Monday at 7, Whitehall. Grants of money were made in aid of building new churches at Borstal, in the parish of St. Margaret, Rochester; Carlinghow, in the parish of St. Saviour, Batley, near Leeds; and South Shields, St. Simon. Rebuilding the churches at Clanfield, St, James, near Horndean; Carlton, near Northallerton; Middleton, in Teesdale, near Darlington; and South Hylton, St. Mary, near Sunderland. Enlarging or otherwise improving the accommodation in the churches at Abergele, St. Michael; Buckland Brewer, St. Mary, near Bideford; Great Driffield, All Saints', York; Eastbourne, Christ Church; Garford, St. Luke, near Abingdon; Great Coxwell, St. Giles', Farringdon; Gressenhall, St. Mary, near East Dereham; Holford, St. Mary, near Bridgewater; Hampstead Norreys, near Newbury; Lea, St. Giles', near Malmesbury; Penrhôs, near Raglan; Plympton, St. Maurice, Devon; Ramsden Bellhouse, Essex; Phapwick, St. Bartholomew, near Blandford; Worcester, St. Ellen; and Wye, St. Martin, near Ashford. Under urgent circumstances, the grant formerly made towards restoring the church at Constantine, near Penrhyn, Cornwall, was increased. Grants were also made from the Special Mission Buildings Fund towards building mission churches at Cross Oak, near Brecon, and New Town, St. Paul, Wednesbury. The society likewise accepted the trust of sums of money as repair funds for the churches at Plumstead, St. James, Kent; Middlestown, St. Luke, York; and Alnwick, St. Paul, Northumberland.

KINGSTOWN.—The foundation stone was laid on Wednesday last of the new Town Hall at Kingstown, Ireland. In August, 1874, the Township Commissioners having advertised for plans, those submitted by Mr. John L. Robinson, 198, Great Brunswick-street, Dublin, were selected. The contract was signed in July last with Messrs. Meade and Son, for the erection of the building for the sum of £12,340. Since then some progress has been made with the works. The building will contain a court, with witnesses', barristers', judges, and jury rooms, and clerk of peace office. The township offices comprise—board-room, town clerk's office, and surveyor's, rate-collector's, and sanitary office. There will also be a large assembly-room, 75ft. by 41ft. 6in., with necessary retiring and cloak rooms. The building, which stands at the corner of the Royal Marine and Crofton-roads, will be faced with chiselled Dalkey granite, with Bath stone and red Runcorn dressings. The court-house entrance will be in the Crofton-road, and the entrance to the township offices and assembly-room will be in the centre of the front to the Royal Marine-road. The work is to be completed in two years. We shall shortly illustrate this building.

LEEDS.—The new theatre and opera-house at Leeds was opened on Monday. The architects are Mr. G. Corson and Mr. J. R. Watson. Thick solid walls separate all the blocks, and the floors are composed of fireproof materials. The accommodation of the theatre is divided into pit and pit-stalls, dress circle, upper circle, amphitheatre circle, gallery, six stage boxes, eight family boxes, eight upper private boxes, and six amphitheatre boxes; the whole giving seating accommodation for about 2,600 persons, in addition to which standing room is provided for 200 more. The central portion of the ceiling is circular and slightly domed. The dome is divided by ribs into numerous panels, filled in with perforated ornamental work, enclosing a magnificent sunlight 12ft. square, cased with crystals and illumined by more than 400 gas jets. The front of all the circles in the auditorium is decorated with rich work in carton-pierre—coloured and gilded. The proscenium is boldly decorated, its adornment including statuettes after Canova's dancers placed upon pedestals at each side. The walls of most of the corridors are lined with tiles, and the floors inlaid with mosaic. Beneath the stage itself there is a working space of no less than 30ft., whilst from the stage level to the gridiron, or floor over the stage, there is a height of 70ft.; and beyond the gridiron there is a further space of 18ft. to the apex of the roof.

STOURTON.——St. Peter's Church, Stourton, was reopened last week after restoration. The building is mainly Decorated Gothic, but there is a good deal of Perpendicular as well. The unsightly western gallery has been cleared away, and the fine tower arch brought out. A tower screen has been erected of English oak. Another new feature is the pulpit; it stands on the north side, upon a carved stone base; it is octagonal, and of oak, panelled, moulded, and carved. The new font is fixed towards the western end of the north aisle, raised upon a step of Forest of Dean stone. It is octagonal in plan, and made in the main of finely-grained Corsham stone. The stone and wood carving throughout the building is by Mr. Harry Hems, Exeter, and to the same artist was entrusted the making and fixing of the font and its cover. The contractor for the works generally was Mr. Joseph Gaisford, builder, of George-street, Westminster. The whole of the restoration has been carried out from the designs and under the superintendence of Mr. Edward Swinfen-Harris, jun., architect, of Stony Stratford, and 32, Craven-street, London, W.C.

THE LONDON SCHOOL BOARD, on Wednesday, accepted half-a-dozen tenders for the erection or enlargement of schools; the particulars are given in our list of "Tenders." The following expenditure was authorised for the supply of the necessary furniture and fittings to schools:—Vittoria-road, Barnsbury (new building), 530 school places, £424 3s. 6d. = 16s. per head; Nichol-street, Shoreditch (new building), 980 school places, £711 12s. 2d. = 14s. 6d. per head; Jessop-road, Brixton (enlargement), 320 school places, £286 16s. = 17s. 11d. The heavy outlay required at the last-mentioned school, it was explained, arose because the rooms are for boys and girls only; in infants' departments the cost is much lower than in other departments, as desks are provided for only one-half the children, the remaining half being accommodated on galleries. It was announced that the following schools have been enlarged and reopened:—Cottenham-road, Finsbury; Bellenden-road, Peckham; and Henry-street, Hampstead. Also that the following schools will be completed and ready for opening immediately after the Christmas holidays:—New buildings—Shepperton-road, Islington; Calvert-road, Greenwich; and Nichol-street, Shoreditch. Enlarged buildings—Stephen-street, Lisson-grove; and Victoria-road, Starch-green.

More than Fifty Thousand Replies and Letters on subjects of Universal Interest have appeared during the last year in the ENGLISH MECHANIC AND WORLD OF SCIENCE, most of them from the pens of the leading Scientific and Technical Authorities of the day. Thousands of valuable mechanical and scientific papers, and numerous receipts and wrinkles, embracing almost every subject on which it is possible to desire information, have also appeared during the same period. The earliest and most accurate information respecting all new scientific discoveries and mechanical inventions is to be found in its pages, and its large circulation renders it the best medium for all advertisers who wish their announcements to be brought under the notice of manufacturers, men of business, scientific workers, and amateurs. Price Twopence, of all booksellers and newsvendors. Post-free 2½d. Office: 31, Tavistock-street, Covent-garden, W.C.

TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.]

All letters should be addressed to the EDITOR, 31, TAVISTOCK-STREET, COVENT-GARDEN, W.C.

TO OUR READERS.—We shall feel obliged to any of our readers who will favour us with brief notes of works contemplated or in progress in the provinces.

Cheques and Post-office Orders to be made payable to J. PASSMORE EDWARDS.

ADVERTISEMENT CHARGES.

The charge for advertisements is 6d. per line of eight words (the first line counting as two). No advertisement inserted for less than half-a-crown. Special terms for series of more than six insertions can be ascertained on application to the Publisher.

Front Page Advertisements and Paragraph Advertisements 1s. per line. No front page or paragraph Advertisement inserted for less than 5s.

Advertisements for the current week must reach the office not later than 5 p.m. on Thursday.

TERMS OF SUBSCRIPTIONS.

(Payable in Advance.)

Including two half-yearly double numbers, One Pound per annum (post free) to any part of the United Kingdom; for the United States, £1 6s. 6d. (or 6dols. 40c. gold). To France or Belgium, £1 6s. 6d. (or 33f. 30c.). To India (*viâ* Southampton), £1 6s. 6d, To any of the Australian Colonies, New Zealand, the Cape, the West Indies, Canada, Nova Scotia, or Natal, £1 6s. 6d.

N.B.—American and Belgian subscribers are requested to remit their subscriptions by International P.O.O., and to advise the publisher of the date and amount of their remittance. If the last-mentioned precaution is omitted, some difficulty is very likely to arise in obtaining the amount. Back numbers can only be sent at the rate of 7d. each, the postage charged being 3d. per copy. All foreign subscriptions, unaccompanied by an additional remittance to cover the extra cost of forwarding back numbers, are commenced from the next number published after the receipt of the subscription.

Cases for binding the half-yearly volumes, 2s. each.

RECEIVED.—W. W. W.—C. and Co.—A. W. R.—N. J.—E. and C.—T. H. P. D. and Co.—M. and Co.—J. H.—A Schoolboy.—A. N.—L. and N.—B. B. Co.

R. T. (Write the Secretary, Whitehall, S.W.)—C. F. M. (Try paraffin, use it liberally about their haunts. We have always found it answer with perseverance.)—ONE AMUSED. (We were quite as much amused as you were, but hardly care about noticing the said cemetery chapel competition further. The medium in question hardly deserves to suffer for the eccentricities of the individual referred to, of whom, by the way, it will probably soon be tired.)

"BUILDING NEWS" DESIGNING CLUB.

LIST OF SUBJECTS.

1. A pair of semi-detached villas for a suburban site, 60ft. frontage and 100ft. in depth. To be executed in brick with tile roofs. Special regard to be paid to compactness of plan and arrangement of windows, so that they may avoid overlooking the pairs built adjoining. Cost not to exceed £1,600 the pair. Three plans, section through stairs, front and side elevations required. Scale ¼in. to the foot. Section may be to a smaller scale if necessary. No basement cellars required. Line of houses to be 14ft. from frontage of site. 2. Details of the entrance door and front windows of the above, with entrance gate and fence, all to be yellow deal, painted. Scale, ½in. to the foot.

MONTAGUE. (Your idea of selecting and publishing designs is not a new one, and it was tried years ago, but with little success, in a similar instance.)

DRAWINGS RECEIVED.—Enigma, Curiose, J. S., Cyprus, North-West, East Anglian, Cleo, Ich Dien, Anglesea, "Motto J.," "Try" in Square, Omnia Vincit Labor, "M" with leaves, Knighton, Chimney Pot, "P" in triangle, Maltese Cross.

OUR COMMONPLACE COLUMN.

RECEIVED.—J. P. E.—G. H. G.—C. F. W.

NOTES and contributions, or quotations on the following subjects or others in letter F and G, will be received on or before the 3rd of December:—Flamboyant, Flange, Flashing, Flat, Flemish style, Fleur-de-lis, Flint, Floor, Floor-cloth, Flue, Folding-doors, Foliage, Font, Footings, Form, Foundation, Foundry, Fountains, Framing, French Casement, Fresco, Fret, Frigidarium, Furniture, &c.

Correspondence.

THE ELECTRIC LIGHT.

To the Editor of the BUILDING NEWS.

SIR,—Having had some experience in the matter of electric lighting, perhaps I may be allowed space for a few remarks. Some twenty years ago, whilst new Westminster-bridge was being rebuilt, I was asked by Dr. Watson, of the "Electric Light and Colour Company," to construct a suitable reflector for the diffusion of the electric light obtained by his patent lamps. A report of the experiments appeared in the *Times* of that period. After much trouble I succeeded in producing a reflector which distributed the light over a considerable portion of the Thames. It is my opinion that in many cases where the electric light has to illuminate a very large space a combination of several lights, centrally placed, and assisted by several special reflectors, would accomplish the desired object more effectually than the opal globes now used in Paris. Further, it is essential that the electric light should be placed at a much greater altitude, thereby disposing in a great measure of the objection to "strong glare." I was in Paris some weeks ago, where, having had frequent opportunities of observing electric lighting in various places, I formed my opinion as to what I venture to submit would be the best mode of applying the electric light.—I am, &c., P. E. CHAPPUIS.

Fleet-street, Nov. 11.

ART LECTURES AND DISCUSSIONS.

SIR,—Your well-timed article, "Art Lectures and Discussions," was, I am sure, eagerly read by many a student, who heartily thanked you for it. The good example you have set by opening a "Commonplace Column" might, I think, be well followed by the Association. Why could not an essay class be formed? It would encourage the diffident to compete for the Association and Institute essay prizes. All cannot become Fergussons or Viollet-le-Ducs, but that is no reason why some students at least should not emulate their noble examples. The chroniclers of the future must be the students of the present. Much has been written about art, but much more awaits to be written.—I am, &c., BOOKWORM.

THE CREWKERNE GRAMMAR SCHOOL COMPETITION.

SIR,—We fully endorse the opinion of your correspondent, "One who will not Compete," for the Crewkerne Grammar School.

The conditions are so outrageous that it is quite time architects as a body refused to enter into such competitions. More publicity to cases of this description may be the means of securing to the profession the respect to which it is entitled.—We are, &c.,

OTHER ARCHITECTS WHO WILL NOT COMPETE.

[We trust the Crewkerne Grammar School Committee will see their way to amending the conditions, or that if they fail to do so architects will abstain altogether from competing. Such action on the part of the profession would soon have a wholesome result, more especially if taken, as in the present case, beforehand. We shall always be willing to do our part.—ED. B. N.]

PARIS EXHIBITION AWARDS.

SIR,—In your last week's issue we notice your announcement of our receiving medals at the Paris Exhibition, for which we are obliged; but you simply give the address as Temple-row, Birmingham, which would be calculated to do us an injury with London architects, as they much prefer their work made in London. Those gates for which we obtained a silver medal were made at our "works in Euston-road;" your representative called and saw them there, and most people have acknowledged they were as good as anything on exhibition.—Yours, &c., JONES & WILLIS.

260, 262, 264, Euston-road, London, N.W.,
November 21, 1878.

Intercommunication.

QUESTIONS.

[5592.]—**Ventilation.**—In ventilation, what cubic space is practically allowed for each person? Suppose a room 12ft. square and 10ft. high, how many persons would it accommodate to breathe air consistent with good health; also how often ought the air to be changed per hour, and how done, without causing draught? If the said room contains 3 gas burners, and a fire burning, what difference would it make?—HUGH.

[5593.]—**Perspective.**—Will any of your practical readers answer me as to whether it is usual, in making large perspective views, to place the building as to distance off truly in perspective—that is, with the first visible foreground the actual ground line of the perspective or plane of the picture? If so, does not this require a very large-sized plan to produce the view from? Are such views as Merrist Wood and other notable illustrations in BUILDING NEWS done so, or made up in the foreground?—PROVINCIAL.

[5594.]—**Foundations.**—Will "G. H. G." or some other reader kindly inform me of the following:—What rule (if any) there is to ascertain the depth below ground level the foundations of a wall should go for safety, the height and thickness of wall being given?—STUDENT.

REPLIES.

[5514.]—**Damp Walls.**—After various attempts to put in other words than my own the view which I had already put as plainly as I knew how, "G. H. G." falls at last into a difficulty as to which of us has built most hollow walls! After this accident to his logic it will be refreshing to go back to the real question in dispute. We began with a case in which on the occurrence of rain, however slight, "the wet soaks right through the bricks, and pours down the inside;" and that state of things I venture to question, knowing as I do that it it is quite possible for the wet to proceed from some other cause, while it is highly improbable for it to arise in the manner stated. I do not question that your correspondent may have built very wet houses whether the walls were solid or hollow, but I protest against its being supposed that this wet, when it appears in quantity as above stated, is to be laid to the account of the climate or the bricks and mortar unless we are sure that the architect and builder have done all they could to keep it out. We are asked to believe that in the southern and south-western counties rain is in the habit of running, pouring, streaming through walls; but when we come to examine the cases some of them shrink into ordinary cases of damp, unused, ill-warmed rooms. Others are manifestly cases where water is let in bodily, through bad design or workmanship in roofs, gutters, and flashings. All sorts of nostrums are painted over the walls with no effect, when a careful practical examination of the building would show where the mischief lay. If your correspondents will reflect that in all these counties (and there are others just as "wet" as they) building has been going on for centuries with worse bricks and mortar and worse-designed walls than are now commonly built, and yet the water does not pour into the old houses in the way now stated, they will take a quiet look into the matter before assuming that they know everything and have done everything structurally that always and everywhere this wet climate of ours requires.—THOS. BLASHILL.

[5522.]—**Thickness of Metal, Glass, &c.**—The following compiled data may be useful:—

Birmingham wire gauge.	Zinc Gauge.	Thickness in dec. of an inch.	Weight of sq. ft. in lbs. Zinc.	Sheet iron.	Brass.	Cop.
No. 24	No. 10	·025	0·76	1·01	1·10	1·16
23	11	·027	0·91	1·12	1·23	1·30
22	12	·029	1·06	1·22	1·37	1·45
21	13	·032	1·22	1·33	1·54	1·62
20	14	·035	1·36	1·51	1·69	1·78
19	15	·041	1·49	1·70	1·87	1·97
18	16	·048	1·62	1·87	2·04	2·15

—A. L., Glasgow.

[5551.]—**Valuer's Licence.**—The clause to which "J. P. O." refers has reference to the architect's function as "arbitrator," and can hardly be put on the same footing as a valuation. An architect's certificate is not a valuation—it is merely a certification that the contractor is entitled to receive a certain amount of money according to contract. A little consideration will show "J. P. O." that the two cases are not identical.—G. H. G.

[5570.]—**Temporary Conservatory.**—Under the circumstances mentioned, you must be careful not to annex the conservatory to any portion of the freehold. Whatever kind of foundation is used, it should merely rest on the soil, and not be let into it. An open wood-rack work floor would suit the purpose better than asphalte. The most portable greenhouses I know of are constructed by Mr. T. W. Helliwell, architect, Brighouse, Yorkshire, on his "patent system of glazing," and to whom "Temporary Conservatory" would do well to write for particulars respecting them.—ROBT. FEATHERSTONE.

[5575.]—**Solid Contents of Hollow Column.**—The answer to this is easy. Take the outside measurement, and subtract the interior measurement from it, viz.:—

30ft. length of column.
6 8ft. diameter = 24ft. circumference.

180 square of 24 = 6.
6

1080 same with the interior measurement,
30 6ft. diam. = 18ft. circumference.
4½ square of 18 = 4½.

120
15

135
4½

540
67½

607½

From 1080
Deduct 607½

Result 472½ft. cube of solid material.
—A. H. S.

[5581.]—**Repairs.**—"Subscriber's" question, of course, will depend on the agreement, but it is usual for the tenant to do such repairs in the absence of any contract. As the walk round the skylight is used by the tenant the broken glass would certainly be a tenant's repair.—G. H. G.

[5582.]—**Ecclesiastical Dilapidations.**—The incumbent is bound to keep the chancel in repair; at least, this is the usual rule, though he is not liable for ornamental repairs, such as painting, &c. I may refer "S." to Grady's "Dilapidations," in which the liabilities of vicars are laid down.—G.

[5583.]—**Gothic Roof.**—"Young Architect" may consult Brandon's "Open-Timber Roofs." I do not know of any book on the scantlings of timbers for roofs of the kind referred to, but if the tie or collar is placed high the principal rafter should be proportionately increased. If the span of roof had been given I could have given "Young Architect" the scantling necessary.—G. H. G.

[5584.]—**Foundations.**—The best way of laying foundations in such a soil is to excavate the peat, and bring up with concrete, but if this is too costly a plan the next best method I would suggest is to confine the soft yielding material by piling round it so as to prevent its flowing. Another good plan is to bring up piers of concrete at intervals from the bottom, and to arch between. A good wide base is necessary to build on, and sometimes a floating platform has been adopted with success.—G. H. G.

[5585.]—**Wood Paving for Churches.**—1. Red pine is most durable. 2. The bed may be of asphalte or concrete; the latter is generally used. 3. The blocks may be about 4in. in thickness, and about the same in width. 4. None; the blocks would wear longer if placed endways to grain. 5. Price will depend on circumstances.—G. H.

[5589.]—**Lead and Wire Gauge.**—I regret the inaccuracy in my reply. 4lb. lead is ·068in. thick No. 16 B.W.G. Allow me to recommend "H. C. B." to use the Whitworth wire gauge, which he will find simpler, more reliable, and more easily remembered than the B.W.G.—E. F. DAWSON.

[5589.]—**Lead and Wire Gauge.**—The thickness of 4lb. sheet lead is ·063in., and the corresponding No. B.W.G. 16.—A. L, Glasgow.

[5589.]—**Lead and Wire Gauge.**—In reply to "H. G. B.," I send the following thicknesses of lead for pounds per square foot, worked out by arithmetic, taking 712lb. to the cubic foot, and the B. wire gauge for the different thicknesses of lead approximately, viz.:—

Lead wt. lbs.	Thickness. in.	B.W.G. No.	Thickness. in.
4	·067	16	·063
5	·084	14	·080
6	·101	13	·094
7	·118	12	·109
8	·135	10	·137
9	·152	9	·148
10	·168	8	·166
11	·185	7	·180
12	·202	6	·208

You will see by the above that the 4lb. lead in Mr. Dawson's reply is an error, and should have been ·067in. in thickness for 4lb. lead, and is approximately equal to No. 16 B. wire gauge.—ANTHONY WATSON.

It is rumoured that Lord Penrhyn has been offered one and a quarter million of money for the Penrhyn Slate Quarries—an offer that, notwithstanding the present condition of the slate trade, is not likely to be accepted.

LEGAL INTELLIGENCE.

CONTRACTS NOT UNDER SEAL.—Hunt *v.* the Wimbledon Local Board.—Supreme Court of Judicature, Nov. 14.—Court of Appeal.—Sittings at Westminster, before Lords Justice Bramwell, Brett, and Cotton.—This was a case of some importance to those who have dealings with corporate bodies. At the trial before Mr. Justice Lindley, at Westminster, last Hilary sittings, it appeared that the defendants, who are the "Urban Sanitary Authority" for Wimbledon, having resolved to erect new offices for the use of the board, directed their surveyor to employ the plaintiff, an architect, to prepare plans and drawings for the buildings they intended to erect. The plans were drawn and were submitted to the defendants, who approved them, and directed quantities to be taken out in accordance with them, and advertised for tenders and specifications for the building. The proposed plan being found to be too expensive none of the tenders were accepted, and in the end new plans of a less expensive nature were obtained and offices built in accordance with them. The plaintiff then brought his action for work and labour in preparing the plans he had furnished. The defence relied upon by the board was that by the Public Health Act, 1875, sec. 174, they, as a corporate body, were only authorised to contract by writing under their corporate seal in all cases where the subject matter of the contract was of greater value than £50. The jury found that the board authorised the surveyor to procure the plans and ratified his act, that the new offices were necessary for the purposes of the local board, and the plans necessary for the erection of the offices. In spite of these findings, Mr. Justice Lindley, who reserved the point and had it argued after trial, decided that the plaintiff could not recover, as his contract with the defendants was not under seal. The plaintiff now appealed. Lord Justice Bramwell, in the course of his judgment, remarked that though in a former case Mr. Justice Blackburn had said that in certain cases justice and convenience appeared to be in favour of holding a corporation liable though the contract was not under seal, he himself was not by any means clear upon that point. It was by no means clear that it was not desirable that in dealing with bodies who had not their own interests at stake, but those of the public, persons should take care that the transaction was carried out in accordance with law; and if careless and slovenly people chose to act otherwise they must take the consequences. In the present case, if more solemnity had been used in the transaction, probably those who gave the order would have cautioned the architect not to make the plans for too expensive a building. It was a dangerous thing to fritter away the provisions of statutes in order to do supposed justice in particular cases. The inconvenience of this had been particularly felt with regard to the Statute of Frauds, of the provisions of which not one man in a hundred who entered into a contract had any idea.

ALTERATIONS TO PLANS.—At Newport (Mon.), County Court, on the 6th inst, Judge Herbert delivered judgment in the case of Benjamin Lawrence *v.* E. Lovell Crasch, tried at the previous court, Plaintiff, a Newport architect, sought to recover £40 for preparing plans and specification at the instance of defendant, a bank clerk at Monmouth, who had instructed him with reference to building a house at Monmouth. When the plans were submitted defendant's wife suggested alterations, and plaintiff altered his plans accordingly. When tenders were obtained defendant found the cost greatly exceeded the sum originally proposed, and refused to go on or pay the plaintiff's claim, on the ground that he had not kept within the stipulated outlay of £800. Defendant, said his honour, must have been aware that the alterations ordered would add very much to the cost of the house; and therefore, though it would have been right and prudent for plaintiff to have warned him as to the additional cost, he could not consider defendant entitled to repudiate the claim. Judgment for £20 only, for plaintiff, and costs.

WATER SUPPLY AND SANITARY MATTERS.

CAMBRIDGE.—Sir Joseph W. Bazalgette, in conjunction with Messrs. Law and Chatterton, has made a special report to the Town Council of Cambridge as to a mode of diverting the sewage of the town from the river Cam, in compliance with the requirements of the Rivers Pollution Prevention Act. Estimating the future population at 50,000, and the rainfall area at 1,200 acres, they propose to intercept all existing sewers, and construct additional ones, all discharging into a main intercepting sewer 2,080 yards long, and falling at an inclination of 1 in 1,100 to a junction with the Newnham sewer, from whence a further length of 2,800 yards will convey the sewage to a pumping station in a field at Chesterton, between the towing path and public road. It is proposed to purify the sewage by broad irrigation upon 400 acres of land adjacent to the pumping works. The cost of the scheme, irrespective of the purchase of irrigation land (estimated at £15 an acre), is set down at £32,000, and, with purchase and preparation of land, in round numbers at £40,000. The report was submitted to the Cambridge Improvement Commissioners on Tuesday week, and formally received and referred to a select committee for consideration.

QUEENSTOWN, Co CORK.—A special meeting of the town commissioners was held on the 8th inst., to consider a scheme proposed by Messrs. Nathaniel Jackson, C.E., and M. O'Keeffe, C.E., for providing the town with a good water supply. A protracted discussion took place on the merits and demerits of the supply given by the present water company, and on the feasibility of such a scheme as that propounded. It was decided to adopt the new scheme for the purpose of having the necessary notices served in time, on the understanding that the final adoption or rejection of the scheme should be decided hereafter by the ratepayers.

STAINED GLASS.

CLIFF VILLA, BABACOMBE.—A painted window has just been placed in the boudoir here for the Right Hon. Cowper-Temple. The window—a ten-light one—illustrates the adventures of "Alice in Wonderland"—an adventure occupying each light, and has been executed under the personal superintendence of the architect. Messrs. Gibbs and Howard were the artists.

GREAT ALNE, WARWICKSHIRE.—The above house, which we illustrated last week, has been filled in a great measure with leaded and painted glass, of a light Domestic treatment, with busts, birds, foliage, &c. Messrs. Gibbs and Howard executed the work for the architect, Mr. G. H. Hunt.

A meeting was held in the Protestant Hall, Waterford, on Saturday, to take steps for erecting a new spire on the tower of Waterford Cathedral. The subscription list having been opened with liberal promises a committee was appointed to arrange a contract. The designs have been prepared by Mr. Fuller, the diocesan architect.

New schools for the Clee-with-Weelsby School Board were opened last month, and accommodate 525 children—viz., boys, girls, and infants in separate departments. The rooms are all on the ground floor, and have each two class-rooms and teachers' room; there is also a board-room. The play-grounds are large and asphalted. The schools are raised on a terrace 3ft. above the ground line, and are built in a simple Gothic style of red local bricks; the main windows are of stone. The roof is slated and boarded, and open to the collar. The warming is by Shillito and Co.'s patent grates. The builder is Mr. C. P. Topham, of Grimsby, and the architect is Mr. Charles Bell, of London and Grimsby.

It is proposed to erect a reproduction of the famous "Coventry Cross," originally built in 1422, in Broadgate, Coventry.

At Rotherham, St. George's Hall Tea, Coffee, and Cocoa House has been opened for business. It is built of red pressed bricks, with stone dressings intermixed with terra cotta. On the first floor debating, club, billiard, and class-rooms are provided, together with lecture-hall seating 400 persons, with separate entrance. On the third floor is an assembly-room, 45ft. by 32ft Messrs. Tacon and Rawson, of Rotherham, were the architects, and Mr. John Scott, of Clough-road, Masborough, was the contractor.

The lessee and executors of owner of the Colosseum Music Hall, Liverpool, the scene of the recent fatal fire panic, were summoned before the stipendiary magistrate on Wednesday for not making the roof secure. The borough engineer, Mr. Deacon, said the roof principals were absolutely rotten, and that a heavy fall of snow or a high wind would cause it to fall. The magistrate made an order that the roof be taken down and the house rendered secure, and warned the lessee not to allow performances to take place till the work has been done.

A correspondent of the *Taunton Courier* writes, protesting against the proposed external restoration of Bicknoller Church. He says that at a very recent period the interior of the church underwent restoration, and there were within the chancel four or five flat stones marking the graves of the Saffin family, two centuries since of importance in the parish. As these were covered with matting the inscriptions had remained almost as perfect as when sculptured. These stones came under the condemnation of the vicar and his architect and have been cast out into the churchyard, one to form a stepping stone and the others broken up to form a rockery beneath the yew trees. Their places in the church are filled, he says, with Minton's tiles of the most approved archæological patterns. The writer refers to other questionable alterations, and suggests that in the coming restoration these gravestones be collected and repaired and set against the chancel wall.

The opening dinner of a large new hotel at Kirkley, near Lowestoft, to be known as the Royal Oak, took place on Thursday week. Messrs. Lucas Brothers were the contractors for erection.

Our Office Table.

AT the meeting of the Limehouse Vestry last week a report was received from Messrs. A. and C. Harston, architects, estimating the cost of the new Vestry Hall at £8,300, which includes brick fronts and Portland-stone dressings, and polished granite columns to the porch. To make the fronts entirely of Portland stone would cost £426 extra. One or two members of the vestry expressed themselves, as on previous occasions, in favour of a competition, but others deprecated any step involving further delay, and expressed their entire confidence in Messrs. A. and C. Harston, and ultimately the plans were adopted, and a resolution passed to borrow £5,000 to proceed therewith.

ON Monday evening Professor Sidney Colvin, M.A., gave a lecture at Birmingham to the members of the Midland Institute, on "The Representations of Death in the Art of Various Ages." He referred to the three main types of the figure of Death, which were represented on large diagrams suspended immediately over the platform. The representations were:—A figure, probably of Death, in the character of a winged youth beckoning with the right hand, naked, with the exception of a girdle and sword, from a relief on one of the lowest drums of the column of the Temple of Diana at Ephesus; a winged angel dressed in a black net, having black figure and countenance with long white hair, long bat wings, with claws on hand and feet, from a fresco at Pisa known as "The Triumph of Death," by Orggagna; and death skeleton crowned, riding on a decrepid horse, with bell round the neck, and carrying a scythe in hand, from a drawing by Albert Dürer. These three figures, he explained, were of the Greek, the Italian, and the Northern types. He explained in detail the difference between the character of the personage of Death as he was conceived in the art of the ancient Pagan world, as conceived by one great inventive artist in Italy, and as conceived by the ordinary popular art of Northern Europe in the middle ages, down to a recent date.

THE annual banquet of the Liverpool Master Builders' Association took place last Tuesday night at the Adelphi Hotel, Liverpool, under the presidency of Mr. John Wells, president of the association. There was an attendance of about 200 persons. Mr. Isaac Roberts, in proposing "The Town and Trade of Liverpool and Surrounding Districts," alluded to the extensive building operations which were being carried on in the outskirts of the town. The increase in the number of houses erected had been exceptionally large during the last three years, no less than 7,400 houses having been built within the borough in that period. That number had only been exceeded once since Liverpool was founded—namely, during the three years 1844-5-6, when 9,638 houses were built. In no other period of three years had a greater number than 6,000 houses been erected, and the average number during the last 37 years had only been 1,540 houses annually. In former years a period of excessive building had been followed by great depression of trade; and this year, he feared, would be the precursor of bad times for the building trades, as they had already overtaken most of the other trades throughout the country. Mr. Sumners, who was present, responded for the "Architects."

THE London and North-Western Railway Company are making rapid progress with the new link of railway by which they are about to establish rail communication between their system and Merthyr, the iron metropolis of the principality, and it is expected that work will be completed within six months from this date. The work now being carried out is an extension of the line from Abergavenny and Tredegar, which has hitherto had its terminus at Dowlais. The present extension, which is only about a mile in length, leaves this line at Penywern, and passes by a bridge beneath two other railways and a highway, and then tunnels through the mountain to Merthyr. The tunnel is 1,040 yards long, with an inclination of 1 in 60 throughout. For the first 200 yards from Dowlais it pierces the millstone grit formation, and then passes suddenly into the

carboniferous limestone. Where the rock was firm the excavation was completed before the masonry work and brick casing were commenced, but in the millstone grit the tunnel was heavily timbered in lengths of 20ft., 15ft., and 12ft, and the lining put in as soon as possible. There will be a double line throughout. The average speed of arching for the first six months has been 120 lineal yards per month. Up to the present time two and a half million bricks have been used for lining the tunnel. The face is of Staffordshire blue bricks, supplied by Mr. Joseph Hamblet, West Bromwich. Those for backing-in come from the Dowlais, Blackavon, and Aberdare iron companies' fields. Ingerson's rock drills were used for driving bottom headings, a comparison of results showing that they executed 2½ times as much lineal work per week as the hand-labour drills, and at an absolutely cheaper rate. They were driven by compressed air at a pressure of 65lb. per square inch. The chief difficulties encountered have been from the irruption of water. The works are being carried out from the designs of Mr. Gardner, M.I.C.E., of London, for the railway company, and under the supervision of Mr. Young, of Abergavenny. The contractors are Messrs. Mackay and Son.

The great bell of Bangor Cathedral, which was remarkable for the brilliancy of its tone, and weighed 29¼ cwt., was cracked about 18 months ago, and after several unsuccessful attempts to separate the edges of the crack by chipping and filing, and thereby checking its further development, it was decided to have it recast. The bell was successfully taken down in June last, and sent to Birmingham to the care of Mr. James Barwell, one of the oldest bell-founders in that town, who has been most successful in producing an exact counterpart of the old bell (excepting the crack), which has this day been elevated to its position. New and improved striking and ringing apparatus are introduced in the present bell, so that a repetition of the accident is not likely to happen in the future.

The Earl of Derby headed a deputation to Mr. Sclater-Booth on Tuesday, to represent the need of additional legislation with a view to diminish the evils occasioned by the noxious vapours from chemical works. Lord Derby drew a sad picture of the barrenness of those districts, chiefly in south-west Lancashire, where this mischief mostly prevails, and said the deputation was unanimous in suggesting that there should be a collective liability on the part of manufacturers for mischief done by the vapours from their works, that the local authority should have power to prosecute for such nuisances; and he believed the deputation would approve of the districts bearing a portion of the cost of additional inspection. Mr. Sclater-Booth said before anything more could be done in this direction the Acts for preventing the smoke nuisance must be generally enforced. He would endeavour to see if he could prevail on the Government to undertake measures which should be, in respect to noxious vapours, a step in advance upon previous legislation.

There are two legitimate and debateable sides to the question as to whether the roof of St. Alban's Cathedral shall be covered with lead or copper, but Mr. J. O. Scott's chief objection to the use of the latter material, on account of its colour, seems to us a baseless one. Mr. E. J. Poynter, Mr. William White, and Mr. E. Ingress Bell have written, remonstrating against Mr. Scott's universal reprobation of the use of copper roofs, and especially against his uncomplimentary reference to the spire of Battersea old church, which is covered with copper. The principal objection to lead on high-pitched roofs, as Mr. White points out, is its constant tendency to "work downwards" by its repeated contraction and expansion with change of temperature. It also involves constant danger of fire through careless plumbers, and great danger to firemen in case of fire through its melting. Mr. J. P. Seddon has a word to say in favour of slate, instancing his own experience in connection with Llandaff Cathedral, in conjunction with Mr. Prichard. At Llandaff small green slates, with a few purple ones mixed with them randomwise, are used, and the result gave, and still gives, satisfaction. Moreover, the subsequent expenditure for repairs, &c., has been insignificant compared with that incurred during the period when the roof was covered with lead.

CHIPS.

The Town Council of Beccles, Suffolk, have accepted the tender of Messrs. Cowdery, of London, amounting to £[illegible],000, for the construction of works of sewerage in Northgate.

Plans have been prepared by Mr. Waring, C.E., for the Cardiff Rural Sanitary Authority, showing a scheme of sewerage and water supply for the city of Llandaff.

The Camberwell Guardians further considered, on Wednesday, the question of the water tank at the new infirmary, said to have been nearly completed from verbal orders given to their architects. The report of the Workhouses Alteration Committee, which explained the circumstances and recommended that the work be proceeded with, was adopted, with the exception of the paragraph stating that the work had been done with authority. A South London newspaper, in commenting on the misunderstanding, asks "why the architect on his own plans estimated the cost of carrying out the plans for the new workhouse at £26,000, when the lowest tender sent in, based on those very plans, was not less than £53,000?"

The Welsh Independent Chapel, at Mount Stuart, Cardiff, was reopened last week after having been decorated and repaired. The contract was carried out by Mr. F. S. Lock, of Cardiff.

The *South London Press* states that the large tract of land parallel with Battersea-park, upon which the Board Schools and Victoria Dwellings now stand, is soon to be redeemed from its present barren aspect, Messrs. Lloyd and Co., of Nine Elms, having purchased some 10 acres, on which they intend erecting dwelling-houses, ranging in value from £500 to £800 each.

The bells at Houghton Church, Hunts, have been repaired and rehung by Messrs. Taylor, of Loughborough.

The Town Council of Bedford decided last week to co-operate with the Bedfordshire county justices in accepting the plans prepared by Mr. Waterhouse, A.R.A., for the reconstruction of the Shirehall and erection of judges' lodgings at Bedford. The estimated cost of the scheme, now adopted (for Mr. Waterhouse has been authorised to obtain tenders), is £17,500.

The contract for laying down wood pavement in Pall Mall has been given by the vestry of St. James's, Westminster, to Messrs. Lloyd and Co., of Nine Elms. Fourteen tenders were received by the vestry.

The new church of St. Martin, Brampton, Cumberland, erected on the site of the old parish church in the main street, was consecrated on Monday week. The church is Early English in style, and seats 500 persons; the cost has been £7,000, exclusive of a western tower not to be carried out at present. On the north side are two stained glass memorial windows, designed by Mr. Burne-Jones, and executed by Messrs. Morris and Co. Mr. Webb was the architect, and Mr. Isaac Morland clerk of works. The contractors for the whole work were Messrs. Besty Brothers, of Carlisle. The joiners' work was sublet to Mr. Court, and the painting, plumbing, and glazing to Messrs. Thomson and Sons, also of Carlisle.

At a general meeting of the Cambridge Antiquarian Society, on the 11th instant, Mr. J. E. Foster exhibited and described a very fine collection of worked flints found on a farm at Wildstreet, Mildenhall, Suffolk, including a scraper, arrowheads flint knife, and hammer stones. Mr. Griffith showed Roman-British urns, recently found near the Observatory, Cambridge.

Two memorial windows have been placed in Stanton-in-the-Peak Church, by the Rev. A. W. H. Gell, in memory of the late Mrs. Gell. The artists were Messrs. Camm Brothers, of 41, Frederick street, Birmingham.

A new Friends' meeting-house has been opened at Coggeshall, Essex. It is 50ft. by 25ft., and 16ft. high, internal measurements; the benches and railings are of white deal, varnished. The building is lighted with star gas-burners, and heated by hot iron apparatus in an adjoining cloakroom. It was erected from the plans of Mr. W. Doubleday, jun., architect, Birmingham.

The restoration of St. Cuthbert's Church, city of Wells, has been commenced by the contractors, Messrs. Meyrick and Sons, of Glastonbury. The tower is the first portion of the work to be undertaken.

A number of the houses from the Rue Internationale at the late Paris Exhibition have been purchased for re-erection in the rising watering-place of West Kirby, near the river Dee, in Cheshire.

The Town Council of Barrow-in-Furness appointed, on Monday week, Mr. W. H. Fox, late surveyor of Dalton, as borough surveyor.

A new Board School for 200 children is now open in Doleliffe-road, Mexborough. It has been built in local stone from the designs of Messrs. Tacon and Rawson, of Rotherham. Messrs. Saul and Jones were the contractors. The cost has been £2,579.

The memorial stone of a new Congregational chapel was laid at Newport, near Saffron Walden, on Wednesday week. The building stands on the site of one built a century since, and will be Romanesque in style, of red bricks with dressings of freestone and white bricks, and will seat 450 persons. Mr. Charles Pertwee, of Chelmsford, is the architect, and Mr. Staines, of Newport, the builder.

An English Baptist chapel was opened in Frogmore-street, Abergavenny, on Thursday week. It is built of native stone, with Bath dressings. The street frontage is emphasised by a central traceried window fitted with stained glass, and by flanking towers, each 75ft. high. The interior is surrounded by a gallery. Accommodation is provided for 800 persons. The contractors were Messrs. Foster Brothers, and George Morgan, of Carmarthen. The cost of erection was £4,000.

A new church at Wentbridge, near Pontefract, dedicated to St. John the Evangelist, was consecrated a fortnight since. It has been built from the designs of Mr. A. W. Blomfield, M.A., of London. It is early English in style, and has nave, chancel, and north and south transepts. Accommodation is provided for 100 hearers. The reredos, the work of Mr. Earp, of Kennington-road, London, is divided into three panels, a cross occupying that in the centre. The lancets in chancel and south side of nave are filled with stained glass by Mr. Pepper, of London.

The death is announced, at the ripe age of 87, of Mr. George Constable, of Lewes, a well-known amateur painter in oils, and art collector.

Plans prepared by Mr. H. F. Bacon, of London, for the repair and restoration of the parish church of North Lopham, Norfolk, have been approved by the vestry.

Considerable improvements are being carried out at Lancaster Castle, including the levelling of the ground in front—an area on which till recently a number of old houses stood, to the obstruction of the view of the castle.

A deputation from the City waited upon Mr. Cross on Tuesday, and represented to him that recent arrangements of the Metropolitan Board of Works had left the City of London less protected from fire than it should be. Mr. Cross promised to give the matter his attention, and said he had ascertained that the Board of Works was now considering the matter.

Mr. Sam Bough, R.S.A., who was born in Carlisle in the year 1822, died at Edinburgh on Tuesday. He began his artistic career as a theatrical scene-painter, became an Associate of the Royal Scottish Academy in 1857, and was advanced to the degree of Academician in 1875. Although he painted many excellent works in oil, Mr. Bough's reputation will mainly rest on his water-colour drawings, which have of late commanded very high prices. As a landscape painter he did much to sustain the reputation of the Scottish school in this branch of art.

On Tuesday afternoon the new Club premises erected by the Liberals of Broughton were formally opened. The Club is a brick building in the Italian style. Upon the ground floor there is a reading-room and a lecture-hall, the latter being capable of accommodating between 300 and 400 people. The architect is Mr. J. S. Whittington, Cross-street; Messrs. Armstrong and Dow, Lower Broughton, were the contractors. The total cost, which includes a large bowling-green, will not exceed £3,500.

A new lecture-hall was opened at Ewell, Surrey, on Thursday week. The building is Domestic Gothic in style, in harmony with the adjacent Congregational church. The hall itself seats 400 persons in the area, on chairs; the platform is spacious, and semi-circular in shape, and the roof is of hammer-beam construction. The building is heated by a gill stove, and lighted by gas; at the rear is a committee-room. The building has been erected within four months by Mr. W. Shearburn, of Dorking, from plans by Messrs. Spalding and Evans, at a total cost, including fittings, of £1,510.

It is stated by the *Surrey Gazette* that Messrs. Pusey and Lumley, builders, of London, have taken the contract for the erection of a crematory building at St. John's, near Woking station, and that the work is about to be commenced.

A series of alterations and repairs have been carried out in St. John's Hospital, Bath, for the trustees of the Bath municipal charities, from the designs of Mr. Spackman, their surveyor, at a cost of about £1,100.

A chapel has been opened by the United Methodist Free Church at Maulds Meaburn, in the Lake district. The architect is Mr. R. W. Crosby, of Kirbythore; and the builder Mr. John Wilson, of Winskill. The building will seat 150 persons.

Christ Church, Crewkerne, has been reopened after restoration from the designs of Mr. J. M. Allen.

Plans, prepared by Mr. Watson, surveyor, for sewering the town of Appleby, have been approved by the rural sanitary authority of East Ward Union, subject to the approval of the Local Government Board and the sanctioning of a loan of £1,250 for executing the works.

Memorial stones of a new Primitive Methodist chapel were laid on Saturday at Thornton, near Fleetwood. Mr. R. Bailey is the architect of the building, which will be 33ft. by 24ft. and 18ft. high from floor to ceiling, and is estimated to cost £250.

Works of drainage have been completed at Ripley, Surrey, from the designs and under the supervision of Mr. Watkins, surveyor to the Guildford rural sanitary authority.

Now that the new pier is in course of execution at Bournemouth, from the plans of Mr. Birch, C.E., the improvement commissioners of the town are contemplating further improvements on the sea front. A scheme has been prepared by the newly-appointed surveyor for the construction of an esplanade and sea-wall, and of an undercliff sewer, and it has been approved by the commissioners, who have applied to the Local Government Board for an inspector to be sent down to inquire as to sanctioning the borrowing of money for the purpose. The cost of the scheme is estimated by the town surveyor at £11,100

The works of restoration now going on in the parish church of Axbridge, under the direction of Mr. J. D. Sedding, of London, have disclosed to view beautiful specimens of fresco and other decorations, dating from the 15th century. The subjects are the Resurrection of our Lord and a scene from the life of the saint to whom a part of the church is dedicated, while the nave arcades and columns are richly decorated in various colours and patterns. Care is being taken to preserve these specimens of mediæval decorative art.

A Local Government Board inquiry was held at Frome before Mr. Arnold Taylor, relative to an application from the Frome Local Board for sanction to borrow £14,000 for proposed waterworks. Mr. Tomlinson, the engineer, gave evidence in support of the scheme, to which no opposition was raised, and the inspector afterwards visited the springs at Egford and the reservoir.

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MEETINGS FOR THE ENSUING WEEK.

MONDAY.—Institution of Surveyors. Discussion on Mr. Birch's paper, read last session, on "The Use of Sewage by Farmers," 8 p.m.

TUESDAY.—Institution of Civil Engineers. Adjourned Discussion on "The Avonmouth, Belfast, and Whitehaven Harbour and Dock Works;" A Paper will be read "On the Heating and Ventilating Apparatus of the Glasgow University," by Wilson W. Phipson, M. Inst. C.E.; 8 p.m.

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Trade News.

WAGES MOVEMENT.

ARBROATH.—The master joiners of Arbroath have agreed to reduce the wages of their workmen from 7d. to 6d. per hour, the reduction to take effect from to-day.

DUMBARTON.—The master house joiners in Dumbarton have reduced the wages of the workmen by 1d. per hour. This will make the rate of wages 7d. per hour—the same rate as is current in Glasgow. The men will agree to the reduction.

DUNDEE.—The wages of joiners were reduced by the employers on Saturday by ½d. per hour—from 8d. to 7½d. per hour.

DUNDEE.—The Dundee joiners on Saturday agreed to a reduction of wages from 7½d. to 7d. per hour under protest.

DUNFERMLINE.—Masons' wages in Dunfermline have been reduced from 8d. to 7d. per hour. The men at first held out for the Edinburgh rate, but as this was refused—on the ground that it could not be afforded in the present state of trade in the district—they agreed to submit to the masters' terms.

EDINBURGH.—At a numerously-attended meeting of the master joiners of Edinburgh, held last week, it was agreed to reduce the wages of the "competent men" from 7½d. to 7d. per hour on and after the 2nd of December. About four weeks ago the rate of wages was reduced ½d. per hour.

JEDBURGH.—The wages of the journeymen masons of Jedburgh have been reduced ½d. per hour. The wages now are for those working in the country 7½d., and for those working in the town 7d. per hour.

MONTROSE.—The masons employed at Montrose have struck work on account of a reduction of ½d. per hour on their wages being intimated.

MOTHERWELL.—On Saturday it was intimated to the joiners in the Motherwell district that their wages would in future be reduced from 7d. to 6½d. per hour.

OXFORD.—At a meeting of the master builders, on the 14th inst., it was decided to give notice to the Operative Stonemasons' Society that a reduction of 1d. an hour will be made in operative masons' wages from 31st May, and that the reduction of 1d. per hour will be made in the wages of the mechanical branches of the trade, and of ½d. per hour in labourers' wages—both the latter reductions to come into operation on 28th December.

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TENDERS.

ARNOLD.—For the building of new classrooms at Daybrook for the School Board for Arnold, near Nottingham. Mr. Clarke, architect:—

Slight	£1,827
Young	1,700
Stevenson	1,684
Tutin	1,660
Donnelly and Coxon	1,638
McCulloch	1,620
Vickers	1,585
Wheatley and Maude	1,581
Wayte, A.	1,580
Slim	1,575
Hodson and Facon	1,571
Wayte, J.	1,566
Clarke	1,546
Roberts and Perkins	1,540
Smith and Greaves (accepted)	1,505
Doughty	1,500
Key	1,498
Wilson and Bulling	1,476
Green	1,418

BEDMINSTER DOWN, BRISTOL.—For the erection of Board schools, teachers' residence, boundary walls, &c. Mr. Alfred Harford, of Bristol, architect; quantities supplied:—

	Original tenders.	Deduction allowed if the words Sampson's bricks are omitted from specification.
Brook and Bruce	£1,989 0 0	£15 15 0
Box, A. J.	1,950 0 0	—
Cowlin, Wm., and Son	1,867 0 0	Difference of cost, if any.
Forse and Ashley	1,821 16 6	—
Lewis and Edbrook	1,770 0 0	—
Beaven, Hy.	1,710 0 0	45 0 0
Stephens and Bastow	1,699 0 0	—
Crocker, R. J.	1,695 0 0	—
Veal, Wm.	1,694 0 0	25 0 0
Cowlin, Samuel	1,689 0 0	—
Beaven, A. J.	1,680 0 0	95 0 0
Saise, Thos., and Son	1,673 10 0	25 0 0
Banner, Wm., and Co.	1,668 10 0	—
Wilkins and Hill	1,659 0 0	—
Gorvett, J. and S. R.	1,625 0 0	27 0 0
Prior, C.	1,600 0 0	—
Rossiter, H. J.	1,540 0 0	10 0 0
Crick, J. (accepted)	1,389 2 0	—

CROYDON.—For alterations to No. 34, High-street, Croydon, for Messrs. Redgrove and Finlay. Mr. S. Brookes, architect:—

Hyde, Chas.	£235 0 0
Cox, J.	193 10 0
Loe, H.	198 0 0
Taylor, M.	181 10 0

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N.B.—DIAGRAMS AND PROSPECTUSES ON APPLICATION.

BERMONDSEY, S.E.—For the enlargement of the Galley Wall-road School, Bermondsey, by 400 places, for the London School Board. Mr. E. R. Robson, architect:—

Downs, W.	£4,646
Nightingale, B. E.	4,568
Jerrard, S. J.	4,247
Tyerman, J.	4,244
Wall Bros.	4,205
Higgs and Hill	4,199
Grover, J. (accepted)...	4,173

[Cost per head of enlargement only (including closet-rooms for entire school), £10 8s. 7d; cost per head of complete school, £10 9s. 4d.]

BERMONDSEY, S.E.—For the erection of a school to provide seat accommodation for 800 children in Webb-street, Bermondsey New-road, for the London School Board. Mr. E. R. Robson, architect:—

Brass, W.	£8,393
Nightingale, B. E.	8,282
Wall Bros.	8,186
Marsland, J.	8,142
Atherton and Latta	7,999
Tyerman, J.	7,959
Shepherd, W.	7,783
Tongue, W. (accepted)	7,667

[Cost of site as far as purchased (area, 15,400 sq. ft.), £5,294 13s.; school buildings, including teachers' rooms and closets, £6,698; tar pavement and playground, £166; boundary walls and gates, £435; schoolkeeper's house, £368; cost per head of school buildings only, £8 7s. 5d.; total cost per head of buildings, including boundary walls, schoolkeeper's house, &c., £9 11s. 8d.]

BOGNOR.—For works to be done at Glamis-street, Lyon-street, and Sudley-road, for the Local Board:—

Harrison, Southwick	£1,982 0 0
Marshall, Brighton (accepted) ...	1,956 0 0
Hayter, Portsmouth	1,849 7 9

BOW COMMON, E.—For enlarging schoolkeeper's accommodation at St. Paul's-road School for the London School Board. Mr. Robson, architect:—

Jerrard, S. J., of Lewisham (accepted)	£180

BROMPTON, S.W.—For the enlargement of the Queen's-gardens School, Brompton, by 240 places, for the London School Board. Mr. E. R. Robson, architect:—

Wall Bros.	£3,077
Higgs and Hill	2,995
Downs, W.	2,988
Jerrard, S. J.	2,969
Hook and Oldrey	2,898
Tongue, W. (accepted)	2,667

[As the area of site is very small, the new rooms have been planned upon arches, increasing the average cost per head. Cost of new school buildings and covered playground, £2,295; new w.c. buildings, £130; works to existing buildings, including new stepped floors, £242; cost per head of enlargement only, £11 2s. 3d.; cost per head of complete school, £11 1s. 2d.]

CROYDON.—For erecting the Waddon Station Hotel, near Croydon, for S. N. Rowland, Esq. Mr. S. Brookes, architect:—

Mutch, W.	£2,440 0 0
Dotterrill, H.	2,335 10 0
Coles, C.	2,179 0 0
Mason and Bristy	1,925 0 0

DARENTH, KENT.—At the School for Imbecile Children for the managers of the Metropolitan Asylum District. Messrs. A. and C. Harston, architects, 15, Leadenhall-street:—

Iron railings, &c.:

Johnson Bros. and Co. (accepted)	£760

Electric bells:

Sax (accepted)	234

DARENTH, KENT.—For new Asylum for Imbeciles for the managers of the Metropolitan Asylum District. Messrs. A. and C. Harston, architects, 15, Leadenhall-street; quantities by Mr. Poland:—

Naylor	£76,800
Downs and Co....	75,000
Perry and Co....	72,500
Vernon and Ewen	71,169
Lovatt	69,956
Stephenson	69,700
Cox	69,565
Crockett	69,000
Wagner	68,000
Baker and Co....	67,283
Wheeler and Co.	67,032
Priddle	61,484
Braid and Co. (accepted)	60,000

EVERTON.—For alterations, Everton Village, Liverpool. Contract No. 1. Mr. G. H. Thomas, architect, 32, Lord-street, Liverpool:—

Wilson	£367 0 0
Bostock	326 0 0
Christian	283 12 0
Nicholson and Ayre	259 0 0
Airey (accepted)	256 0 0

FOLKESTONE.—For repairs, painting, and replastering front of Belle Vue Hotel for Messrs. Langton and Co. Mr. Burgess J. Reeve, architect:—

Prebble	£143
Slade	85
Hoad	80
Petts and Son (accepted)	79

FOLKESTONE.—For erection of house on the Canterbury-road for Mr. J. Sharp. Mr. Burgess J. Reeve, architect; quantities supplied:—

Jenner	£510
Slade	460
Reason (accepted)	420
Payn (withdrawn)	320

FULHAM, S.W.—For the enlargement of the Harwood-road School, Fulham, by 420 places, for the London School Board. Mr. Edward R. Robson, architect to the Board:—

Manley, M.	£4,852
Wood, F. and F. J.	4,715
Cox, C.	4,570
Wall Bros.	4,550
Shepherd, W.	4,500
Ashby Bros.	4,498
Lawrance, E.	4,445
Bangs, W., and Co.	4,430
Hobson, J. D.	4,375
Higgs and Hill	4,344
Hook and Oldrey (accepted)...	4,333

[This school, designed by Mr. Basil Champneys, is one of the earlier ones erected by the Board, and was not built with power of enlargement. Cost of extension of building, £3,561; cost of extension of playground, boundary walls, and gates, £772; cost per head of enlargement only, £10 6s. 4d.; cost per head of complete school, £8 10s. 11d.]

GUILDFORD.—For an addition to coach factory, Spital-street, Guildford, for Messrs. May and Jacobs (exclusive of ironwork). Mr. Henry Peak, architect; quantities supplied:—

	Estimate.	Addition for boarding and felt.	Total amount.
Swayne, William ...	£1,045 10 0	£35 1 3	£1,080 11 3
Mason, Robert ...	995 0 0	53 0 0	1,048 0 0
Mitchell Bros. ...	997 0 0	39 8 3	1,036 8 3
Strudwick, George ...	982 0 0	44 0 0	1,026 0 0
Nye, Richard ...	969 10 0	34 10 0	1,004 0 0
Swayne, Thomas ...	985 10 0	10 0 0	995 10 0
Colls and Sons ...	858 0 0	29 0 0	887 0 0
Goddard and Sons ...	830 0 0	36 0 0	866 0 0
Smith and Sons ...	810 0 0	52 10 0	862 10 0
Garnett, George ...	828 0 0	12 7 0	840 7 0
Pearce and Clark ...	808 0 0	12 0 0	820 0 0
Moon, Alfred W. (acc.)	789 10 0	30 6 9	819 16 9

HAMPSTEAD.—For rebuilding the Hare and Hounds Tavern, North End, Hampstead, for Mr. W. Brett. Mr. T. P. Ashby, architect:—

Builders:

Shepherd...	£2,792
Stamp and Boutell	2,379
Andrews	2,170
Jackson and Tood	2,100

Gasfitters:

Dunn (too late)	—
Gardiner and Son	100
Dodson	98

IVER.—For alterations and additions to house "Coppins" and erection of entrance lodge at Iver, near Uxbridge, for J. E. Taylor, Esq. Messrs. Tarring and Wilkinson, architects, 69, Basinghall-street, London, E.C.:—

	House.	Lodge.
Langridge & Sons, London...	£8,138	£807
Kearly, C. F., Uxbridge ...	6,800	718
Adamson, T. H., and Sons, Turnham-green, W.	6,767	738
Fassindge and Son, Uxbridge	6,275	625

LAMBETH.—For the erection of temporary iron building to accommodate 800 children (at 8 sq. ft. per scholar) in Parton-road, Nine Elms:—

Hook & Oldrey, Kensal-road, W. (accepted)...	£784

HORNSEA, NEAR HULL.—For chimney, tank, water-tower, and roof for the Hornsea Local Board's waterworks. Mr. B. J. E. Bruce, engineer:—

Brick and stonework:

Hudson, John, Hull	£1,974 10 0
Raw, W., Hull	1,694 0 0
Hulse and Stephenson, Hornsea ...	1,435 0 0
Jackson, G., and Son, Hull	1,415 9 11
Musgrave, B., jun., Hull (accepted)	1,275 0 0

Ironwork:

Close and Ayre, York...	2,268 18 0
Rollit Bros., Thorne	2,222 0 0
Ashmore & White, Stockton-on-Tees	2,155 0 0
Rushforth and Thornton, Bradford	1,807 0 0
Head, Wrightson, and Co., Stockton-on-Tees...	1,767 0 0
Young and Akrigg, Hull	1,750 0 0
Bells, Lightfoot, & Co., Newcastle ...	1,718 0 0
Newton, Chamber, & Co., Shorncliffe	1,551 0 0
Lees Bros., Ilkeston (accepted) ...	1,427 12 0

PLUMSTEAD.—For the erection of five houses and shops, boundary walls, &c., at Herbert-road, Plumstead, for Mr. Robert Webb. Mr. E. Taylor, architect, Woolwich:—

Cattell	£4,175
Lonergan and Sons	3,900
Johnson	3,895
Niblett, E.	3,873
Jones and Co.	3,607
Hobern	3,600
Shapley, E.	3,589
Taylor and Co.	3,587
Prout, W. (too late)	3,575
Warr, F.	3,354
Parker and Evans	3,250
Smith, C....	2,820

SANDGATE.—For alterations, repairs, and decorations to Farleigh House for J. R. Daniel Tyssen, Esq. Mr. Burgess J. Reeve, architect:—

Hoad	£1,560 0 0
Webster	1,499 0 0
Holdom (accepted)	1,205 10 0

SOUTHWARK.—For rebuilding the Coburg Warehouse, Lower Pickle Herring Wharf, Southwark, for Messrs. Hicks, Nash, and Co. Mr. S. Brookes, architect, Croydon; quantities by Mr. R. L. Curtis and Sons:—

Hobbs, J. W., Croydon	£2,730 13 2
Mason and Bristy, Croydon	2,669 0 0
Perry and Co., Bow	2,649 0 0
Stevens, A., London	2,418 0 0
Parsons, E., London	2,395 0 0
Jarrett, C., Croydon	2,354 0 0
Mortar, J., Stratford	2,345 0 0
Greenwood, London	2,330 0 0
Cowland Bros., London	2,330 0 0
Legg, H., Croydon	2,318 0 0
Taylor, M., Croydon	2,165 0 0

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THE BUILDING NEWS.

LONDON, FRIDAY, NOVEMBER 29, 1878.

THE REFORM CLUB-HOUSE.

WE promised to give our readers a description of the decorations lately carried out at the Reform Club-house, Pall-mall, from the designs of Mr. E. M. Barry, R.A. They are now completed, with the exception of a few fittings and the necessary general cleaning up, and the effect on the whole is decidedly satisfactory. As we have hinted before, the late Sir Charles Barry devised a scheme of coloured decoration, which was, however, not executed at the time of the completion of the building in 1841, and it has been left since that period in an unfinished state. Mr. E. M. Barry was entrusted with the task, and he has in the present work of ornamentation followed the ideas of his father as nearly as was possible without drawings to aid him. Entering the grand hall or saloon we notice that considerable changes have been made, with the result of enhancing the contrast between the Sienna imitation marble columns which surround this area and the walls behind them. These columns, executed in scagliola, have been cleaned and repolished, the background or corresponding pilasters being now altered from white to a deep red marble, or brocatello. The effect of this change is to throw up the light shafts of the Ionic columns of the saloon, and to produce a rich relief or contrast of tone previously absent, besides increasing the apparent limits of the hall. The upper gallery of the saloon, the columns of which are superposed upon those below, are similarly relieved, the angle pilasters and margins round the picture frames being replaced by red brocatello. We cannot overrate the execution of this part of the work, the scagliola marble having been done by Messrs. Bellman and Ivey, of 95, Wigmore-street, Cavendish-square, who have generally executed all the scagliola work, the pilasters of the grand staircase, and other parts of the interior. The entablature between the colonnades has been coloured in strict harmony—the architrave faces immediately upon the gilded capitals are in shades of brown and olive, enriched with gold; the frieze is treated in a rich maroon, with medallions over the columns, while the members of cornice are also decorated in brown and gold. The bases of the columns have been executed in white polished Parian by the above-named firm. A black marble blocking course or plinth rests upon the lower entablature, the balustrade being in the original marble, with capping of Sienna. Above the upper range of columns rises a dome or deep glass cove, with diamond-shaped squares, the bars of which have been richly gilded, while the ceiling at the top has a centre panel of pale blue, in the middle of which is suspended the sunlight lamp. The spandrels of this ceiling have been painted maroon or brown, and gilded, and the effect by gaslight is even more satisfactory than when a strong daylight enters the dome, which by contrast renders the ceiling too dark to enable one to realise the tints employed. The coffee-room on the ground floor has been completely transformed. Before, the oak graining gave it a very ordinary appearance; now a rich dark dado of deep chocolate-red, with black plinth and moulding, surrounds this spacious apartment; the wall panels are of a neutral green, with deep red margins or stiles. The fluted columns which adorn the sides, and break the length of room into bays, are in two shades of brown, the fillets of the flutings being of the lighter shade. The frieze has stencilled honeysuckles upon a dark green ground, the ceiling is finished of a delicate green, with a double shade for border; these with the margins of brown and red, the gilded fret and enriched cornices, the framed recesses of windows and pier-glasses, painted in two shades of brown, relieved by black in the mouldings, and highly-polished, combine to produce an effect of richness without redundancy, mainly due to the employment of a pervading key-note of colour. In this room we observe Messrs. Verity Brothers have introduced their patent ventilator or air-propeller in the piers between the windows. This consists of a small horizontal fan, motion to which is given by a current of water through pin-hole jets, which operate on a kind of fly-wheel. Grated openings in the piers, head high, allow a current of air so propelled to enter the apartment, and a meter is provided by which the current can be regulated to a nicety. The water which gives motion to the fan is allowed to trickle through small orifices in the inlet tube, by which means the air is cleansed of fog, and a chamber above the fan is provided for ice to cool air in warm weather, or to introduce disinfectants or fumigants.

The lower library or reading-room is another harmonious work of colour and gilding, the scale of colour being low, and composed mainly of shades of green and brown. The most noticeable feature is the frieze, adorned with the figures of the Parthenon frieze in relief—a deep rich crimson ground throwing up the figures. Above is a rich cove of green covered with gold stars. The grand staircase has been repainted in the ceiling, panels of light blue being relieved by bands of brown, and together with the effect of the old scagliola panels of white and Sienna, make a charming feature. The card-room displays a depth of rich colour in shades of dark brown. There is a brown dado. The wall surface is covered with rich-stamped leather or paper of a Renaissance pattern, highly-relieved by gold. The deep cove and frieze, with relieved foliage, are bronze-like in effect, the only relief being a blue panel in centre of ceiling clouded. Contrasting with the card-room is the small smoking-room overlooking Carlton-terrace—an apartment about 25ft. by 18ft., which has been transformed from a common-place and dark chamber into a light and cheerful bower-like pavilion. A Pompeian style of decoration has been adopted, the walls being painted in colour, representing arcades in perspective, and the result is to give size and depth. Between the pilasters the wall spaces are painted blue with clouds, the idea being to suggest the open air—an effect well sustained. The ceiling slopes to a lantern, and these sloped parts are decorated like a trellis, with vine leaves creeping upon it. In the centre lantern a velarium is painted above the ventilation openings, and the light tints—the Pompeian red and black dado—produce quite an illusive effect. But the *chef d'œuvre* is the great library. Here the predominant tone is that of bronze and gold; the Corinthian columns which break this fine apartment into recesses appear shaded in gold, there being almost a metallic glow or lustre in the effect. Anything like positive colour has been strictly avoided, and the general tone of bronze has been heightened simply by gilding. In the lower part of the room the tones are dark shades; the fluted columns have reeds of gold in the flutes, the fillets being of bronze green; the capitals of gold. The splendid ceiling is relieved simply by shades of lighter green, the margins being crimson, while in other panels the relieved ornament is painted of a delicate shade upon a gold ground. The rosettes and floriated scroll work and enrichment of the cornice and ceiling are everywhere gilded or in shades of russet brown relieved by crimson, and on the whole we must say Sir C. Barry's magnificent Italian club-house has been perfected at last. These very successful decorations have been executed by Mr. C. Schmidt, of 49, Kingsdown-road, Holloway, and we must add reflect considerable credit upon him both on account of the artistic qualities displayed and the care bestowed in finishing the work. Mr. P. Edgar is the clerk of the works under the architect.

THE CONDITION OF THE THAMES AT HIGH TIDE.

A QUESTION of deep concern to the inhabitants of the metropolis, and one which affects all towns on tidal rivers receiving sewage, is now engaging the attention of the Metropolitan Board of Works. It will be remembered that some time ago a report was presented to the Thames Conservators by Captain Calver, in which it was alleged that the sewage poured into the Thames at the outfalls at Barking and Crossness was shoaling the river; and that, in fact, the sewage, instead of being carried out to sea, is retained in a certain section of the river's bed, about eight miles in length, and that it oscillates, or is carried up and down the river, twice every day. It is contended that this sewage is carried down during only about half the ebb-tide, and is then turned back, the returning tide catching it; and that the foul mass of water is then driven upwards past the outfalls and Woolwich Reach; and that at high water or spring tides, it reaches as far up as Blackwall. It has been further stated that the sewage only progresses towards the sea at the rate of five miles in a fortnight, and that this moving section of the river contains the London sewage—not merely of one day, but of 22 days. In other words, that a volume of polluted water, 8 miles long, 750 yards wide, and 4½ feet deep, is constantly rolling backwards and forwards twice each way in every twenty-four hours, between Blackwall and Gravesend. This alarming statement has received some additional force lately from a rumour that, at the time of the unfortunate collision between the Princess Alice and the Bywell Castle, the victims were immersed in the particular portion of the river which is rendered poisonous by the discharge from the outfalls of the main drainage.

We do not intend now to enter into the whole question raised by the Thames Conservancy Board and their officers, and which has lately been reiterated in reply to the counter-statements made by Sir Joseph Bazalgette and his Board. It will, doubtless, in due time, be made the subject of an investigation. One step towards such an investigation, and in reply to the last-named allegation, was made last Saturday, when the chairman, Sir J. M'Garel Hogg, M.P., a committee of the Board of Works, accompanied by their engineer, Sir Joseph Bazalgette, their consulting chemist, Mr. T. W. Keates, and other scientific men, went down the river in the Alexandra steamer, for the purpose of taking samples of the water between London-bridge and Gravesend at high water, and of deriving some information, from the evidence of their own senses, as to the accuracy of the allegation made of the poisonous state of the water during the outflow of sewage. We do not pretend to say the inspection of last Saturday will afford conclusive evidence to refute the objections urged by Captain Calver, as the condition of a river in November, swollen by a large amount of upland water, can scarcely be taken as a fair test of the purity of the water under the less favourable circumstances of dry warm weather. At the same time, the examination in con-

nection with another visit of inspection to be made next Saturday, during the period of low water, will enable the committee to judge of certain statements put forward by the Thames Conservators, alleging, among other things, that there is an accumulation of 21 days' sewage in that section of the river receiving the same, and called the "sewage zone," and that, by the superior transporting power of the flood tide, such an accumulation is carried back to Woolwich, to the detriment of health; and it will enable them further to form some decision as to whether any deposits of mud or silting up of the bed are going on along the banks and channel, and whether the river above the outfalls is affected by them. These are questions, it appears to us, which will be fairly answered by well-timed periodical inspections such as proposed by Sir Joseph Bazalgette and the committee, and we are glad to find that a previous examination of the river has been made, and that there is a determination to follow up the matter and to solve any doubts that may exist. Such a course we strongly recommended in this journal not long ago, together with a careful survey of the bed of the river, for the purpose of making periodical soundings to discover variations of level and other features. At least two important bearings of the question will be cleared up by these examinations—namely, the comparative amount of pollution attributable to the London sewage outfalls compared with other sources of pollution, and whether the assertion that at flood tide there is more suspended matter in the water than at other times be correct.

The Alexandra left London-bridge at about half-past ten o'clock last Saturday, so as to be at the northern outfall, at Barking, at high tide, thence to proceed down the river for the purpose of taking samples of the water for examination and analysis. Of some importance is the fact that all the earlier samples taken from London-bridge to the London Docks were of a very turbid character, the sample glasses exhibiting a thick yellow or brownish liquid—due largely to clay and the tributaries which enter the river at this part—while lower down, near the Commercial Docks, the dips became clearer instead of denser. This created some surprise, as the steamer had at this point entered what has been called the "sewage zone," where greater pollution was looked for. The next specimen, taken at Deptford Creek, near the entrance of the Ravensbourne, showed more pollution; but the following one, at East Greenwich, was normally clear, the previous thick sample being obviously due to clayey matter in suspension carried down that tributary. Again, at Blackwall-pier, above the Lea, the sample was thickish, but clearer than previous specimens. The dip at Woolwich-pier was noted as rather "thick and brown;" and at Gallion's Reach, at a point in the middle of the "sewage zone," and near where the Princess Alice sank, much clearer. At Barking Creek the water looked muddier, and, the steamer proceeding down in the centre of the sewage section of the river, other dips were made. The course the sewage takes after its discharge at Barking was traced, and may be seen in a map of this portion of the Thames prepared by Sir Joseph Bazalgette, and appended to his report. It will be observed that the line of flow of sewage from the outlet is deflected by the stream from Barking Creek, after which it spreads out and continues its course for about a mile below, where it finally loses itself. The samples of water taken after leaving Woolwich were, perhaps, more important, as they were selected from the sewage zone after the penstocks were raised. At Crossness, above the outfall, we observe it a trifle clearer, though here the noxious smells from manure manufactories, &c., were remarked by those on board to be intolerable. Off the West Kent Outfall Works, near the site of tanks, the water was tolerably clear, with a saltish taste; a little further down, near Erith, a large flock of sea-gulls were observed, which come up the river to meet the down tide, and it was noticed that they select the sewage streams for food. Off Northfleet, close to the north shore, we noticed a thicker liquid, sedimentary, with but little smell, but in mid-stream, and near Grays Thurrock, the water was tolerably white, though rather cloudy in appearance. The specimen taken below the mouth of the Darenth was rather thick and muddy, showing matter in solution. So much for the journey down the river. Returning two hours later, on the ebb tide, upon the same track, when the outfalls were discharging, the samples on the whole were rather turbid or cloudy, but generally without offensive odour. At Grays Thurrock it was clouded, at Long Reach turbid; at site of West Kent Outfall more clouded; above Darenth the water was very turbid, attributed to the river scour; about three-quarters of a mile from Crossness of similar opacity, gradually increasing in turbidity and foulness till the outfall was reached, where the sample taken was much thicker, of a dirty brown, and with slight smell. Above the outfall the water became perceptibly clearer, and continued to improve; at Barking Creek the same thickness was observed, and immediately above the water became clearer. A sample taken by boat in current of sewage matter was very thick, brown, and offensive, but just in the mid-channel of ordinary density. The most offensive sample was, however, that taken at the Beckton Gasworks outfall, which was of a blackish green colour, thick, and of intolerable odour. Specimens further up showed water of normal clearness.

We have been particular in noting the above samples, as they lead to important conclusions, and tend to corroborate the report of Mr. T. W. Keates, the consulting chemist to the Board, who found by careful analysis that all traces of sewage pollution were lost at about a mile and a quarter below the outfall. If we take Mr. Keate's observations, chemical analysis failed to discover any nitrogenised organic matter at this distance, and that in fact samples of water taken 2 miles further up agreed substantially with it. Many objections will doubtless be made to the superficial examination of the water made last Saturday, besides the one of flood dilution. One of these is that the course taken by the steamer was not that of the polluted streams from the outlets, which, for some distance, "hug" the banks, leaving comparatively pure and untouched the main stream of the river. It may also be urged with some force that the lighter specific gravity of the sewage matter prevents it from becoming mingled with the main body of the water, and especially with the current; while at the same time the lighter floating matter adheres to the banks, hugging them for a considerable distance, depositing on its way much of the filth. It is a fact, easily proved by observation, that sewage matter does not freely intermix with a stream or running current, but that it closely follows the banks till, perhaps, it becomes drawn into the mid-channel by the sucking action of passing steamers. Next Saturday, inspection of the banks will indicate how far this depositing process has affected them, and if in such an appreciable degree as to render them obstructive or dangerous to health—care of course being exercised to distinguish from such deposit the effects of erosion of the mud or alluvial banks in the bends of the river by the action of the scour. It is rather difficult to draw any conclusions from the samples of water taken and the tour of inspection made last Saturday, and we await the second expedition down the river with the object of examining the banks and bed of the river, before we venture to form any opinion of the result. In the meantime, if any conclusions can be drawn from the specimens of water during the time of high water, one of them is certainly that the accumulation of sewage in the sewage section of the river has been much exaggerated, and that the alleged superior transporting power of the flood tide has not had the effect imputed to it of carrying up the river the sewage pollution of the outfalls in sufficient quantity to be perceptible to the senses. We trust the attention of the explorers next Saturday will be particularly called to the muddy deposits in the creeks and tortuous parts of the river above and below the outfalls, for the express purpose of comparing them with the character of the alluvial banks subject to the abrading action of the tideway, many of which have visibly crumbled away at Crossness and Erith. Specimens of these deposits should be collected for analysis, and soundings will doubtless be made along the bed of the stream to determine whether any silting up of the river bed is taking place. It is only fair to add that the passengers experienced last Saturday very offensive smells at intervals between Blackwall and Northfleet, caused by the noxious fumes from guano, bone-boiling, and other works—sources of contamination that should certainly be brought under the control of a recent Act we have before alluded to, and which fumes have by many been confounded with the drainage pollution.

WINTER EXHIBITION OF PICTURES AT THE DUDLEY GALLERY.

THE pictures now on view at the Dudley Gallery display, as usual, a large number devoted to rural subjects and domestic incident. As may be expected, we observe few of historic or dramatic interest, the collection being principally made up of landscape and *genre* painting. Marine subjects—many of much merit—occupy, as before, a conspicuous place; but pictures of home and still life are in abundance. We look in vain for any great picture of ideal power or stirring incident, though in the above classes there are many conscientious renderings of nature that manifest at least a healthful sign so far as regards our rising painters. One of the first we note is "Mosaic," by Matthew Hale—a subject treated rather metaphorically: a dark Italian girl lying flat on the ground, engaged in placing blue tesseræ in an unfinished mosaic paving. The background and handling are decorative in character, and the picture has undoubtedly a symbolical meaning that places it above many others. No. 15 ("The Old House") shows an elderly woman, intended as the housekeeper, dressed in neat black, seated in a homely room, engaged at needlework. In the dark doorway behind her is the figure of a young soldier (possibly the son) approaching; the accessories and room are truthfully painted to nature. The artist is Mr. Walter S. Stacey. Mr. H. S. Marks, A.R.A., contributes two pieces. In "Peace with Honour," an old gentleman (apparently a student or clergyman) is seated in his study, clad in a dressing-gown, reading. The quiet and primness of the study are depicted by a cat sitting in the window-bay, with eyes half closed; and the expression of the venerable reader, with the background of portly volumes, the disused paper lying on the floor, and the framed print in the window recess, are indicative of a genuine interpretation

of the title chosen. The colouring is natural, and the adjuncts are carefully executed. "Meadow Hay," by Hamilton Macallum, is rather a misnomer. It is really a cleverly-painted scene on the margin of a river, in which a girl is unloading a boat laden with new meadow hay. There is a quiet evening effect in the sky and water, and the girl and hay are very well painted. Mr. Léon Lhermitte—that excellent artist in old street scenery—sends two charming pieces. One, "Marchande à Morlaix," a very pleasing cabinet picture, representing a picturesque French street, with overhanging gabled and timber houses. The figures of women at the shop doors, with their white caps, and the corbelled stories of the houses, are cleverly and transparently painted. "La Rue de St. Mâlo" (No. 295) is another forcibly-painted sketch of a piquant bit of street perspective, in which the broken line of the frontage, thrown in strong shadow, is made the principal feature. The colouring is very sombre and subdued in tone, and there is a cold morning effect in the piece, in which, however, the artist's care in drawing architectural detail is evident. These two pieces are certainly the only masterly subjects of an architectural character in the collection. "Cowslips" is a close and clever rendering by Helen G. Parker, with a wealth of colour in the blue china setting. One of the most striking forest scenes is "Wandering Home" (73). It is a pine forest, with a labourer leisurely walking homewards. The sunset glow on the firs is too harsh in colouring, however, to be natural. Frank Walton is the artist. "Home through the Woods" (88) is a very similar conception, by F. Morgan, and far more truthful in the painting. Through the glade a woodcutter, with a bundle of cuttings on his shoulders—the fruits of his day's toil—is returning homewards. The fir-trees are vigorously handled, and their lofty heads contrast pleasingly with the evening sky. In No. 79 ("When Poverty comes in at the Door, Love flies out of the Window") the artist, G. F. Watts, R.A., sends a suggestive composition of an allegorical kind of some dramatic power. Poverty is personated by a gaunt emaciated figure of a man—half-clad, with the wolf by his side, bespeaking the beggar—entering by a door, through which the winter leaves are driving. A young woman lies on a couch, her face buried in her hands, while Love, in a young man, winged, is escaping through the open window on the sunlit side of the apartment. The allegory is simply told—the colouring is dramatic in its treatment, but the head of Poverty is too small. "On a Thames Ait" (97), by Ernest Waterlow, is a pretty every-day picture. "Tabley Old Hall, Cheshire" (99), by J. Fulleylove, is an interesting remnant of ancestral architecture—a subject very scantily represented in the Gallery. We note (111) "Fishermen's Children," by Robert Macbeth, as a cleverly-conceived incident, but spoiled by the blueish tone that pervades water and dress. Of a decorative character is "A Daughter of the Vine" (123), by Walter Crane. We confess we look carefully into this work, and find little that is meritorious either in drawing or colour. The figure under the trellis-arch of vine is surely out of drawing, and the colouring needs more contrast. Near it is "Looking out for the Homeward Bound" (J. T. Nettleship)—a picture in which a girl, with a dog by her side, seated on a cliff, are eagerly looking towards the blue sea. The hair of the girl, streaming in the breeze, and the eager gaze expressed in the dog's eye, are well painted. "The Medway at Maidstone," by Albert Goodwin, is a softly-painted landscape. "Morning" is the title of a small picture, in which the artist, Percy Macquoid, has certainly given that soft aërial and chilly effect characteristic of morning. In No. 140 ("In the Madonetta Canal, Venice") Mr. C. Earle shows a pleasant bit, but we cannot say much for the architectural drawing. One of the few ideal subjects exhibited is "Poetry" (135), by Matthew Hale—a decorative treatment, in which are two female figures in recumbent positions on a couch. In the reclining figure the limbs are badly drawn and awkwardly placed. The arm holding the book is certainly much too long, and the defect at once strikes us. Certainly the best picture—or one of the cleverest, is 148, "Under a Changeful Sky," by F. Morgan. On a heath, quite open, sits a gipsy, with her infant at her breast, and by her side, with a countenance half in terror, half in reverie, with anxiety depicted in her eyes, leans forward a dark-haired gipsy girl. The expression of both, and the detail and heath, with the smoke ascending in the foreground, and the figures in the distance, are admirably true to life. The "Shrimper" (161), by Mr. C. Napier Henry, is well drawn; but "Fishing for Smelts," by the same author, is an exceedingly fine study of river scenery. The net, and distance seen through it, are marvellously truthful. "A Bit on the Thames," by Mr. Chas. Smith, is a sketch of river scenery, familiar and pleasant in tone and colour. "Red Roofs, Hampstead," by Mr. W. C. Symons, is a cluster of bright-red roofs amid foliage—a work unpretending but faithful. Under the title of "Engagements," Mr. J. D. Watson sends (169) a picture hung in a conspicuous place. Its story is simple, and pathetically told by the artist in the expression of the young lady dressed in white, and in the young man in his full dress; but, beyond the very ordinary incident it recalls of ball-room life, the head of the girl and the dress are very skilfully executed. A "Girl Reading" (183), by Mr. St. Clair Simmons, is cleverly handled; "San Barnaba, Venice" (193)—a good subject, harsh in colour, by Mr. Charles Earle; "The Bath" (219)—a youngster getting washed by a girl—is a homely circumstance, told with much fidelity and humour, in a plain way, without artifice or over-colouring; Mr. Robertson's "Tryst by the River" (224) is exceedingly natural; and 206, "A Corner in a Japanese Curio Shop," is a charming study of design and colour. "In Search of Sea Drifts" (256) is a richly-painted picture, awakening pleasant memories of the sea-side. The wet sand left by the retiring wave, with the reflection and shadow of the horse, is very accurately rendered. The greenish hue of the water and the sheen left along the beach by the wave are, indeed, the chief points in the simple picture of Mr. Colin Hunter; and these he has seized upon, and made, by a masterly knowledge of detail, to take the place of a more elaborate theme. "Cleaning Up" is a common duty made a telling picture. The artist—Mr. G. Sainsbury—has, in fact, made up his picture from the fewest materials; but those he has well chosen. The old woman's dress, the brown old oaken dresser behind, and the cleverly-painted open casemented window, are very telling. "Weary Waiting" (290), by Mr. Walter Stacey, is not so clear. An old man is seated in a chair with pensive face, while a woman is cooking something at a fire. The execution is careful. No. 301, "A Lady of Cairo Visiting," by Mr. F. A. Bridgman, is a well-finished picture of Eastern manners. The figures are cleverly grouped, and the architectural details of the structure in the background are painted with considerable knowledge and skill. In "Memories" (315) Mr. J. D. Linton gives us a darkened chamber, with a girl kneeling down with clasped hands, on the floor being a bag of needlework and pearls. The colouring has a great depth of tone, characteristic of Mr. Linton's work. No. 333, "Majolica Frieze, descriptive of Works of Charity, Pistoja, Tuscany," by Mr. Frank W. Topham, is chiefly remarkable for an expressive group of figures and a rich frieze, but the perspective of the arcade is certainly faulty. Mr. J. W. Waterhouse's "Flower Seller" (342) admirably depicts a familiar scene—an Italian girl, leaning against a wall, engaged in tieing up her flowers. The girl's face is full of expression. One of the most striking pictures is Mr. S. E. Waller's "Cupboard Love" (346). It shows an old tapestried hall, with a lady, richly attired, feeding some favourite deer which have entered. One, too timid to enter, is looking through the door, while another of more precocious instinct is looking in at the open buffet. The accessories are happily introduced. We have only space to mention a few others that impressed us for delicate manipulation. No. 382, "First Steps"—a clever study of infant life, with some faultless painting; No. 366, "Pavillon du Vieux Pont de Sèvres: halting-place between Versailles and Paris," by Sophia Beale; "Wallflowers" (370); "French Marigolds" (410), by Mr. Edgar Barclay; an amusing reminiscence of old-fashioned costume called "Banter" (409), and another, "A Visit to Kew Gardens in 1820." We must also call attention to No. 55, "A Summer Afternoon," by Mr. P. Macnab—a fine painting of blue water, in which an atmospheric effect is cleverly handled; "Water Lilies," by Gertrude Martineau (36)—a wonderfully faithful and delicately-painted picture of still water. The boys' heads peeping above the long grass are admirable in colour and harmony. Nor must we omit No. 365, "The Keeper of the Sacred Sparrow," by Mr. J. R. Weguelin—a classic conception, rich in colour, if not entirely faultless in drawing.

WHISTLER v. RUSKIN.

THE verdict of the jury in the above case, however dissatisfied the parties to the action may be with it, certainly seems agreeable to the common-sense of most people. It can, of course, only serve to confirm the regret entertained by all true admirers and friends of both gentlemen concerned that the case should ever have come on for trial at all. The absurdity of submitting questions of taste to the arbitration of a jury has probably never before been so well illustrated as during the late proceedings which must have been perused with something like shame by all who have any real regard for art, or any true respect for those who honestly strive to point out the merits and demerits of artists. We are, indeed, spared the suspicion which, had the case concerned less distinguished litigants, must inevitably have forced itself upon the minds of outsiders—that the whole affair was an arranged advertisement of the pretensions of a pushing artist and the prowess of an unscrupulous critic. The position occupied by Mr. Whistler is so assured—and, so far at any rate as this country is concerned, so unique—that he might have well afforded to disregard the self-forgetfulness which so far overpowered Mr. Ruskin as to permit himself to import the ordinary terms of abuse into art-criticism. Even a superficial acquaintance with Mr. Ruskin's works might have taught him that after all it was only that gentleman's manner of expressing himself. Such words as "coxcomb," "imposture," and "impudence," are probably meant to have but a Pickwickian significance when used by the great club-bearer, who, perhaps, is aware of his reputation as a hard-hitter, and not unwilling to maintain it. An artist with greater faith in his own infallibility might possibly have detected a

compliment veiled beneath the outward asperity of Mr. Ruskin's attack. "Flinging a pot of paint in the public's face" is after all scarcely a more come-by-chance method of painting a picture than that adopted by the painter who in a paroxysm of disappointment is recorded to have flung his brush at his canvas and accomplished an effect denied to oft-repeated attempts and agonising study. If indeed any real importance attached itself to the abuse mingled with Mr. Ruskin's criticism, it seems hard to discover why Sir Coutts Lindsay did not feel equally outraged with the artist whose works he "ought not to have admitted." Wiser in his generation, he left the painter to seek the farthing's worth of consolation which the jury have awarded to Mr. Whistler's wounded feelings, and to pay the price for it. We have no intention here of entering into the technical merits of the dispute. Our readers have their own opinions as to the beauties of Mr. Whistler's works, and however these may vary, those who hold them are united in their appreciation of his artistic powers. Of the fact that he possesses and has displayed some of the qualifications of an artist, no one can be unaware, however much they may have been confused by the manner in which the daily journals have improved the occasion during the past week by expounding them to the public. Our concern is, first that one who has done so much for art and art-literature as Mr. Ruskin has, should have descended to the use of language altogether unworthy of himself; next that an artist should have thought it worth while to adopt legal proceedings at all; and lastly that their united bad example seems but too likely to be followed by others. A comparatively insignificant illustration of the truth of this last remark —in connection with which by the way, Mr. Whistler's name incidentally occurs—is to be found in another page of this number. Artists of all grades and classes would do well to remember that after all their works are the true guardians of their reputation. A banker or man of business has a real cause of grievance against any one who attacks his credit, because that is the foundation of his professional existence, and because the damage can be approximately assessed in pounds, shillings, pence. But an art-worker—whether poet, painter, architect, or man of letters—should surely rise above all this. Open and legitimate attacks may be met with advantage in a proper manner. Controversies must arise —perhaps quarrels with them. But that when smarting under real or supposed injustice advantage should be taken of vulgar means of retaliation, or of opportunities for attacking others innocent of offence, is discreditable to all who so act. If any remnant of chivalry is left us in these days, at least those who believe it should observe the rule of refusing to fight with vulgar weapons or with enemies unworthy of them. If we have outlived such considerations, there is an old proverb to be remembered, if for the sake of decency alone, which bids us "wash our dirty linen at home."

FIVE ELIZABETHAN JOHNS.

SHUTE, alone, as already observed at page 501, is unconfused with one or other of the rest. The record of his death in 1563 has not been disputed. I now propose to treat of the Thynnes of Longleat. The family carries back its ancestry to the reign of King John, at which period the name was Botevile; but the genealogist, with a pleasing association of fact and fancy, accounts for the change by stating that John Botevile came to be called, from the place of his residence, John-o'-th'-June, and thence Thynne. One member of the family was Master of the Household to Henry VII. William Thyme edited the works of Chaucer. His son Francis was Lancaster Herald, and a great collector of historical antiquities. The assassination of Thomas Thynne in his coach in the Haymarket, 12th February, 1682, is sculptured on his memorial tablet in Westminster Abbey. The settlement of the family at Longleat came about in a well-known way, and the name of the place has been simply and satisfactorily explained. *Leat*, in Saxon, meant to lead, as water or an aqueduct. (The name of Sir Francis Drake is connected with an example of this kind near Plymouth.) The stream that drives a mill is sometimes called a leat, and there is known to have been a mill belonging to the monastic buildings that once occupied the ground. John Thynne, coming from Shropshire, made his first purchase from the grantees of Henry VIII. in 1540. He was knighted in 1547, and married the daughter and heiress of Sir Richard Gresham the year after. He had been one of the Protector Somerset's secretaries, and is supposed to have been rewarded by a share of the surrendered property that fell so abundantly into the duke's hands. Upon the fall of his patron, he resided upon and enlarged the boundaries of Longleat by new purchases, and when a fire had injured the buildings gave directions for the present mansion. Accounts of the building are preserved, but no mention occurs of the arthitect or his fees, and the assumption has thus been made that he conducted it himself. Yet, by concurrent tradition, the design is attributed to John of Padua, and held to bear a close resemblance to the Protector's house in the Strand, known to be his work. Nothing, indeed, could well be more probable than that the retired and wealthy secretary should consult the foremost architect of the day, whose acquaintance he had made under the auspices of their common patron. That Thynne, on the other hand, should have been the designer of this noble mansion is eminently unlikely. So, also, Britton's suggestion that John of Padua and John Thorpe were identical, if not advanced upon slight reflection, is certainly no longer tenable. But I see nothing at variance with some sort of discipleship, and that Thorpe survived the other fully thirty years would seem to be fairly shown. It has been very well remarked that one who trudged away from his native village as plain John Thorpe, might serve an apprenticeship to the Muses under the brightening influence of Italian skies, and return as Giovanni di Padova; but Thorpe seems to have justified no inference of the kind. He was English throughout, not to say ostentatious of his nationality Britton says "Somerset House, in London, and Longleat in Wiltshire—the most generally acknowledged works of John of Padua—are amongst Thorpe's drawings in the Soane Museum. But I have pointed before to the inconclusiveness of such testimony, unless the chapel of Henry VII. is also to be assigned to him! John of Padua's appointment was made in 1544, and Holland House is dated 1607, which makes too wide a range to be probable. There is nothing, moreover, in Thorpe's book of the graphic vigour to be expected from the atmosphere of Italian studios —such as Shute displays—but which can hardly be looked for from the practical surveyor or organiser of works; nor from the man of scholastic training, like Kaye or Wren. Were it pardonable, however, to regard Thorpe as sometimes acting rather in a business than artistic capacity, the whole of the buildings referred to in his volume might have fallen consecutively under his care. Of him I propose to say no more. Sir John Thynne commenced his house January 21, 1567-8, and finished it March 29, 1578. The cost is put down at £8,000. The Queen paid a visit to Sir John in 1575, at which time, the building had no doubt acquired a sufficient state of completeness for the royal entertainment. The family obtained a baronetcy in 1641. The titles of baron and viscount date from 1682, and the marquisate of Bath from 1789. Some of these particulars are drawn from an admirable account, read by Canon Jackson within the walls of the mansion, and in the presence of the marquis, to the Wilts Archæological Society. An assembly sitting, as the reader playfully remarked, like a jury on the very body of the place! Short as this narrative may appear, it sufficiently and authentically disposes of the architectural pretensions and doings of Sir John Thynne, whose ennobled descendants are yet living in our midst.

With regard to the remainder of this subject, though at the risk of seeming to fetch a compass, it may be convenient to bear in mind the career of Reginald Pole. He was related to Henry VIII., and after serving his terms at Oxford, and obtaining some Church preferment, was sent by the King to Italy for further study. On returning to England, he offended Henry by opposing his divorce from Catherine; and thereupon quitting the country, returned no more until the accession of Mary. That Queen had reason to be grateful, and throughout her reign no subject held a higher place than Cardinal Pole, Archbishop of Canterbury, Legate of the Pope, and Chancellor of both Universities. Fuller, in his "Worthies," notes that he studied at Padua, and "degenerated into a perfect Italian." Queen Mary and Cardinal Pole both died in November, 1558. John Kaye, M.A., left England in 1539 for Padua, where in a couple of years he became professor of Greek, and graduated M.D. He returned in 1544. During a space of nearly five years he had thus been in contact with a scion of the royal stock of the Plantaganets, who, though self-expatriated, continued to be an object of interest at the English Court. Whether Kaye had any mission does not appear, but he was certainly treated with favour by Henry, and the pseudonym that in Thorpe's case was so very improbable, here becomes a natural and well-earned appellation. Is it not idle, in the face of evidence like this, to contend that in the self-same year of our Lord, 1544, there was yet another John, more worthy to be styled "of Padua," albeit no man can enlighten us by one iota of his antecedents or his exit? Is it not infinitely more reasonable to assume that Kaye, a man of learning and position, just arrived from the favourite realm of art, should be appointed "Designer of his Majesty's Buildings?" That he was not a professor of construction or design is nothing. Who was William of Wykeham apprenticed to; who Sir John Durham; who Sir Christopher Wren; and not to come later down among king's architects, who Edward Blore? When one rich man was questioned by the Privy Council concerning his "great and sudden wealth," he sufficiently excused himself by saying that he had had the Duke of Somerset for his master. So had John of Padua, and possibly with a similar result. In one case it led to the foundation of a noble house, and (by the assumed parallel) to the re-erection and re-endowment of a college in the other—the college, founded, let it be remembered, by Doctor Kaye (who seems to have been his own architect), having its most noted features traditionally associated with John of Padua! John Kaye can be traced from birth in his father's Norfolk house to school and college; thence to Padua, and home again. He can be followed to Court, to learned retirement, and to the tomb. He was patronised by Henry VIII., was physician to Edward VI., stood in favour with Philip and Mary, and at Elizabeth's visit to the University in 1564 the Queen lodged at King's, and the maids of honour at Caius. Surrounded at all times by theologians he seems to have surrendered to them his individual sentiments. Pitseus, from this cause, thought he had no very determinate ideas, but was always of the same religion as the reigning monarch, like the Berkshire Vicar of Bray in those four reigns—who, according to Fuller, commenced as Papist, then became Protestant, next Papist again, and then Protestant once more! The danger attending "determinate ideas" in times so fluctuating may have induced the dedication of the college gates to incorporeal attributes rather than to names allusive to the ruler of the day. Despite all cautiousness, however, his last days were made sorrowful through the discovery, among the college stores, of certain vestments and ornaments preserved, though disused, since the previous reign.

Information on the whole subject might be amplified by further research. "Memorials of Cambridge," by Wright and Jones, and Cooper's "Athenæ-Cantab" have been consulted here. But the points of contrast now shown, together with those in my "Chapter of Transitionists,"

may sufficiently identify Kaye of England with him of Padua, and dispose of the five Elizabethan Johns. THOMAS MORRIS.

ARCHITECTURAL ASSOCIATION.

THE fortnightly meeting of the Association was held on Friday evening; the President, Mr. H. L. Florence, in the chair.

ELECTION OF MEMBERS.

There were 63 nominations for membership, and, according to the usual custom at the association, the names would have been put from the chair, and voted for *seriatim* by a show of hands At the commencement of the meeting, however, Mr. William Scott formally demanded that a ballot be taken upon the names. The Association could now, he considered, afford to be more careful as to qualification for membership, and to render it somewhat more difficult, and therefore more of a privilege, to obtain admittance. He hoped in the future it would be considered a special honour to have been exempted from ballot. He proposed one such exception in the present list—of a member of the Royal Hibernian Academy, whose works were very well known—Mr. W. H. Lynn, of Belfast. The President having put Mr. Lynn's name to the meeting, he was unanimously elected by acclamation, and the ballot took place on the other 62 names—an operation which occupied an hour and a half. The event showed that no fewer than 19 names were blackballed. The following were elected:—T. Watkins, M. Yetts, E. Herbert, H. Phelps Drew, E. B. Nevinson, A. W. Garson, A. H. Fisher, C. H. Brodie, Walter Scott, J. T. Newton, W. W. Ballard, W. J. Gathercole, T. A. Nash, A. O. Collard, H. W. Moore, A. White, W. Russell Ryley, F. E. Littler, D. R. McBlane, E. A Sutton, Ralph Johnson, E. Lloyd-Jones, W. I. Whitehead, C. G. Kilminster, H. W. Roberts, C. J. Marshall, R. W. Hastings, J. A. Gotch, H. Monson, A. B. Friend, G. F. Harvey, C. F. L. Young, H. Searle, E. H. Sharpe, W. Dickenson, W. Howard, A. Bridges, G. H. Fillott, G. W. Miller, J. A. Mingay, H. Allen Crockers, and H. Yorke. 15 nominations were read.

WINDOWS.

Mr. Aston Webb, Vice-President, delivered the following lecture, illustrating his remarks from a series of drawings (some of which we reproduce amongst our photo-lithographs), and by sketching on the blackboard details.

"Windows," the subject of my paper, is one so necessarily interwoven with the very first principles of design that I venture to think it needs no apology from me for bringing it before you this evening. From the time a member sends his first sketch to the Class of Design he will find (as long as he remains in our profession) that it is constantly engaging his attention, and requiring all the skill he can bring to bear to solve the various problems presenting themselves in his active practice; but in reading a paper in the short time very properly allowed by our Association, it becomes difficult to select even a portion of this subject sufficiently restricted to allow of comparatively adequate treatment. The one I have chosen is practically unlimited, and which, in relation to design, we could, probably most of us, talk on till doomsday. I propose, therefore, at once greatly to restrict its scope, and thus enable me to bring forward some considerations and suggestions which I hope may be worthy of your attention, and afford many here an opportunity in the discussion afterwards of adding to our general store of information and instruction, which is the main object of our meetings here. I do not propose, therefore, to notice windows employed in ecclesiastical or public buildings; neither do I propose to trace their introduction and use from the Ark downwards, but rather to endeavour to consider their treatment for modern domestic purposes, more especially as adapted to town houses, referring only to old examples to illustrate what appears to me to be their superiority or inferiority over those now generally in use. That windows are or should be an all-important element in modern design, no one in this room, I take it, would care to question, and their use at once marks a great point of departure between our modern architecture and that of the ancients. The architecture of the Egyptians and of the Greeks may be said practically to have been windowless, as far as the examples remaining to us bear testimony, and it was not till the art spread further northwards towards our more uncongenial clime that windows came to be a necessary feature in design, and naturally asserted themselves, so that the ancient Greek types had gradually to be abandoned, and it is this necessity of windows that has proved one of the greatest sources of failure in the endeavour to implant these styles in our country in the present day. That the stately portico of the British Museum, for instance, should screen several stories of windows lighting offices, lavatories, and cloak-rooms, can hardly seem satisfactory to any of us, and whereas in this climate light and cheerfulness are the great desiderata, it can surely not be open to doubt that windows should play a leading part in the external elevations of our buildings. Please to bear in mind that I propose, as far as possible, to consider the treatment of windows apart from any particular style, aiming simply to arrive at their requirements, and the best way of meeting them. It seems a self-evident proposition, yet one that is continually disregarded, that the size of the windows must be regulated by the size of the rooms that they are intended to light. Yet nothing is more common than to see cases where three windows, all of the same size, "to preserve the uniformity of the elevation" (as the speculating builder says), light three rooms of totally different sizes, the result being that one bedroom is fairly lighted, the other is very dark, while the dressing-room is so light that you hardly dare dress in it without the blind being drawn down, as you seem to be quite out in the open air. It is extremely difficult to lay down any law giving exact rules as to the proportion of lighting space necessary for a given room—much depends for instance on the position of the light; in the well-known example of the Pantheon at Rome, the building is amply lighted by a small circular opening in the roof. The cubic contents of this building are given at 1,934,460 cubic feet, and the area of the circular opening only 572 feet, or about one-third of the amount required had the lighting been from the side. The rule said to have been adopted by Sir William Chambers is to add the depth and height of the room together, and an eighth of the result will give the width of the window. Gwilt gives, as a general rule, 1ft. super. of light in a vertical wall to every 100 cubic feet in the room. Robert Morris says that the superficial area of the window should equal the square root of the cubical contents of the room; this, however, though no doubt approximately true, must evidently be open to large variations, according to the width of the street, and especially according to the aspect and the climate; and the exact size of certain windows to suit certain shaped rooms can only be learnt by observation and experience. The matter is one of the greatest importance, and cannot be too carefully considered. It should be also borne in mind that certain rooms will require more lighting than others: a drawing-room more than a dining-room; a dressing-room rather more than a bedroom, and so on; and if this is carefully attended to (and of course taste and discrimination used), the elevation will be at least an honest and truthful one, and you will not find the principal windows on ground floor lighting, as is often the case, a cloak-room or a w.c. Assuming now that you have settled the amount of glass area that will be required to pleasantly light the room according to one of these rules, the next question is the proportion or masses in which this shall be arranged, and here at once in the case of dwelling-houses we are met by two very definite rules:—1st, that the sill must be 2ft. 6in. to 3ft. from the floor; and secondly, that the head of the window should be as near the ceiling as possible—this, though not always attended to, is of immense importance to the cheerfulness and good lighting of a room. This, therefore, determines within a very small margin the height of your window, and it then remains for the architect to decide on the distribution of this space, whether it shall be in one mass or in two, three, or four; and here, of course, rules cease to guide, and taste, judgment, and experience step in. Though, however, there are no actual rules to guide us in this all-important question of the distribution of the lighting area, there are many reasons which may affect our arrangements, and as this is the most important part of my subject I will go into it a little more at length. The main objects to be aimed at are two in number—firstly, the effect of the arrangement as seen from the room; and, secondly, the effect on the external elevation, and it is the judicious application of the window to suit both the internal and external requirements that calls forth some of the highest qualities of the architect. I have placed the internal effect first as being the most important, though no design can of course be considered satisfactory which does not meet both requirements. The first axiom that may be laid down under this head is that wherever a room is so large that *one* well-proportioned window will not properly light it, then that room (assuming the light is from one side only) must have *three* windows, not necessarily of equal size, for it may have one large and two small, but it should on no account have an even number of windows in one side. No doubt most of you have noticed, on going into a room lighted with two windows in one side, there is something unsatisfactory about it. The room strikes you as gloomy, and that there is a pier where there should be a window, yet hundreds of town houses are built, entirely ignoring this first principal, and generally again "to preserve the uniformity of the elevation," which is usually divided into three bays. I have a drawing here (see illustration No. 1 on photo-lithographic sheet) showing the usual arrangement. Thus, the ground floor has an entrance-door and two windows, and the remaining floors three windows on each floor. The result is the dining-room strikes you as gloomy, with a large central pier. You then go to the drawing-room, which is usually well lighted and the best room in the house, having a centre window, but above this again the window over the porch in each floor lights a small room, sometimes a dressing-room, and the principal bedrooms again have a pier in the centre, with the same gloomy result noticed in the dining-room, the disadvantage here being largely increased by the difficulty of properly arranging the furniture—a matter which should be always considered in the design of a room and the disposition of its windows. In this case the dressing-table must either stand between the windows where the light will be very bad, or it must stand under one of the windows, when, being one of the principal pieces of furniture, it will give the whole room a one-sided appearance. The windows are all double-hung sashes, with the exception of some, perhaps, which are fixed, and usually the head of the window is some distance below the ceiling in order to allow an elaborate cornice full of builders' stock enrichments to run its headlong career over the top of it, and often also a little bit of wall space which the paper-hanger finds is not large enough for one pattern on the paper, and so leaves it altogether, hoping the curtains will hide it, as they often do, for there are no arrangements made for these or for the blinds, or indeed for anything. This is an unexaggerated description of the windows of the houses run up by speculating builders, in which nine-tenths of us Londoners and other dwellers in towns are doomed to live. Any idea of ventilation by means of them, except through the ill-fitted sash, does not seem even to have troubled them. This is a very common instance of the sacrifice of internal comfort for external uniformity of appearance, for it is true of the outside as of the inside that a void should fill the centre of the wall. But there are many ways of combining the two advantages, and as in all cases where design is made subsidiary to the internal requirements, the external effect is much improved. Uniformity with builders takes the place of design, and perhaps it is better it is so. An arrangement is shown (see No. 2) which endeavours to meet some of these defects without having any striking novelty in it. Please remember I am not alluding to the *style* of design in *any* way, but merely to the *arrangement* of the windows as a *basis* of design. Here you get a good triplet window in the centre of the principal rooms on ground, second, and third floors, and in the drawing-room a variety of

form which lends itself well to the various uses of that room. Externally the effect is surely better than the other, and if repeated down a street *ad infinitum* it at least presents some breaks and variations to relieve the eye, almost entirely wanting in the former more usual example. Possibly, in the case of a speculating builder, the unlovely uniformity of Gower-street or Wimpole-street is preferable to the variety which they sometimes aim at. Another advantage in my eyes is that it marks the principal rooms, and gives some clue to the general arrangement, which the other does not. I have already mentioned that it is as important not to have a central pier externally as internally, and this is a rule more generally observed than the other. Speculating builders even seem to have an idea that they ought to get a window in the centre externally if possible. The importance of this can be well appreciated by looking at the Army and Navy Club in Pall-mall, where the entrance elevation has a central bay — that towards Pall-mall having a central pier, and the dignity the one has over the other is seen at once. The arrangement of the Thatched House Club, in St. James's-street, is good in this particular. On the ground floor you have the entrance door and three large windows lighting the reading-room; this arrangement, you will notice, gives a central pier externally, but to avoid this on the floors above a bay window is thrown out, being, to my mind, a very satisfactory solution of that particular difficulty. One other building in Pall-mall I will notice, as, though satisfactory in some respects, and well detailed in many, strikes me as an example of what is to be avoided in the way of the arrangement of windows. Taking the ground floor you have the old arrangement of two windows and entrance door already noticed, and as if to make matters still worse each of these windows is divided in the centre by a centre mullion, and on looking in at the door you will see even this again has a centre pier opposite to you. But to return to the general question of the disposition of windows; this, of course, varies somewhat with the style which may be adopted by the designer, but here again there are certain rules which never vary in any well-considered and well-balanced design. Sir Charles Barry is generally admitted to have been a master in this disposition and balance of wall and window spaces. The elevation of Bridgewater House towards the street is a good example of this balance and proportion, and the Reform and Travellers Clubs are two other well-known examples. At the same time in these Italian examples, though there is so much to admire, on examination of the plan we are often compelled to admit that too much is sacrificed to the elevation. Sometimes we find a dummy window (and I think the least fastidious about truth in architecture would find it difficult to justify this), or sometimes we find one of these large well-proportioned windows lights a w.c., or that part of these first and second-floor windows light one larger room, no indication whatever of which exists externally. As to the proportion of voids to solids in an elevation I venture myself to think that the only true law that should guide us in the designing of modern buildings for modern purposes is that of the necessities of the internal arrangements. The Metropolitan Building Act lays down that the area of voids shall not exceed the area of solids, but this is with a view to solidity more than architectural effect, and is relaxed if sufficient stability can be otherwise shown. I would say that in designing a warehouse, where light is the great desideratum, the windows should be, as they often are, the main feature of the design. You may hear people say that a building only looks like a huge warehouse, and if it is one this is great praise. If the building to be designed is a prison, then the stone walls should be the most prominent, and the openings towards the streets, if any, should be small. A prison might be actually just as safe if the external walls had tiers of well-proportioned dummy windows, but it would not look so to the eye, and would be universally condemned. The same, therefore, should hold good in buildings generally between these two extremes. Depend upon it, it is this external expression of the use of a building that we should rely on more than anything, for the development of a style distinctive of the 19th century. Take, for instance, the windows of an ordinary county house. Nothing is more charming to the eye than the windows of old Kent, Sussex, or Worcestershire houses of 150 years ago, with their quaint, long, low, many-divided windows and white frames flush with outer face of wall. I have here (see illustration) a drawing of one of these—very charming and picturesque it is. I measured it, as modern improvements compel its entire removal. Externally it is partly half-timbered, covered with vines, and lichen-grown tiles. Internally it has no room more than 6ft. 10in. in height, and daylight can be seen between most of the window frames and the wall. Now, in rebuilding this house the rooms will be about 10ft. high, and therefore, following the rule that the sill should be 2ft. 6in. to 3ft. from the floor, and the head as near the ceiling as practicable, you will see at once that these long low windows become impracticable, and therefore, not to be attempted in any way. It seems rather hard to give them up. They are so quaint and pretty, but depend upon it, it is the only thing to be done, unless you want to build a little imitation cottage in which the farmer will curse the architect through all his tenancy. Modern requirements must be met if architecture is to live, and there are many signs abroad that we have studied the requirements of our ancestors long enough, and must now think more of the requirements of our clients. I do not mean that we must give up our picturesqueness. There is plenty of room still for that; but we must adopt modern forms, and express modern requirements, and make our houses look as if they were inhabited by modern men and women, and aiming at this, we shall without doubt arrive at a modern style. And now I come—having settled the number and proportion of our openings—to the much-vexed question as to with what they shall be filled, and here at once the question of modern requirements arises, and asks for a practical solution. It is a question beset with many difficulties—the introduction of large sheets of plate glass being the disputed point, and here it is no good looking to the public for light; for, while some will say "you *must* avail yourself of this modern invention, *I will* have *all my* windows filled with it, and will use nothing else, *I* like to *see* the view unobstructed, &c.;" others say, "if I must have plate glass, let me have as little as possible, it's so *vulgar*, and I don't want to make *my* house look like a *shop* or a *club*, &c." Well, like most other questions, there is something to be said on both sides, and our object should be to look at the matter from both sides, and endeavour to combine the two, as far as possible, from an artistic point of view. The great difficulty in dealing with plate-glass is the bare, bald, appearance it gives to the elevation externally, which makes it in many cases extremely difficult to use it successfully. We may summarise roughly the two modes of overcoming this, as firstly by dividing the window opening by transoms and mullions; and, secondly, by dividing the glass itself by sash-bars, &c. Plate-glass, when used in the small sheets required for a mullioned window, is comparatively easy of application; the sheets are so reduced in size that the baldness does not become apparent, and much may, therefore, be said in favour of mullioned windows, by which method a room may be as well lighted with as ample glass surface although that surface may be separated by mullions. Still, there are many people who resolutely decline to have mullioned windows; even though the sashes or casements are filled with plate, they consider that mullions, if they do not obstruct the light, obstruct the view, and therefore they will not have them at any price, and the real difficulty of the treatment of plate-glass then begins; and here I would say that no doubt the Italian styles lend themselves more readily to the introduction of large sheets than do the English Gothic styles. To refer again to Sir Charles Barry's Bridgewater House, though the panes are there divided by sash-bars, they are so slight that they hardly have an appreciable effect at a little distance on the general design; but the same architect did not venture to employ the large sheets at the Houses of Parliament, plainly showing that he considered at least that the one style lent itself more readily to this modern improvement than the other. During the last few years a much disputed compromise has been largely used—viz., that of employing a large sheet in the lower sash, and small squares in the upper one. I have employed this myself, but like most compromises I can't say I think it wholly satisfactory. On one occasion I had to take plans for a small house before a well-known architect, and he said to me, "You don't mean to persecute your client with these small bars, I hope;" and when I said I did, he said, "Why, when I look out of the window it is generally through the upper pane, and I love to watch the sky and the ever-changing clouds, and I could never do this through your small panes;" and he seemed so in earnest about it I have always felt there was something in it, and when on another and later occasion a committee passed a resolution to omit the small panes in another small house of mine, I confess I did not feel quite so confident that I was all in the right, although I knew it would greatly damage the general external effect I had aimed at, and so it did in the design. Still, I thought a tenant might some day live there, who also had a strong love for the sky, and he again would condemn the architect who had done so much to destroy his enjoyment of it. Some will say, "Oh, we architects must do what we consider best, and not risk our reputations by trying to please everybody, as we shall probably be like the man with his donkey, and please nobody." Still we must remember that houses are built for men to live in, and their convenience should most undoubtedly be our first consideration. I confess, therefore, I am still in some dilemma on the point myself, and though I certainly have not found out a way of employing large sheets of plate-glass satisfactorily, I feel there is some reason in the objections raised against small panes, though I do no not share them as far as regards my own personal feelings. Mr. Robson, in his book on "School Architecture," speaking on this subject, says:—"In case of breakage, the danger to the children from falling glass is much slighter from moderately-sized pieces, while the ever-recurring glazier's mending bill is in each case less. Now that modern science has succeeded in making sheets of glass larger than a dining-table, we are in danger of passing with too rapid strides from the old-fashioned diamond quarries to the opposite extreme. There could hardly be a more complete mistake than to indulge in the taste (or want of taste) where a school is the subject." Plate-glass we are all ready to use as a great improvement, on account partly of its great strength, and partly on account of its perfection in manufacture, so that we can see objects through it without distortion or obstruction of any kind. We all know the painful feeling of looking through sheet glass, where objects are magnified and diminished in the most wonderful way, according to the different parts of the glass you look through; but surely the simple fact that plate-glass can be made in very large sheets does not lay on us the obligation of using it in the very largest sheets that our openings will allow. One revolution made by the introduction of plate-glass should be mentioned—namely, the abolition of shutters, for, if people could be only brought to believe it, plate-glass windows are far safer and more difficult to get through than the antiquated many-divided shutter, with its clumsy bar and bell, which nine times out of ten gives a warning falsely. Of course, if shutters are abolished, great care must be taken to see that the sash fastener is really what it pretends to be. Endless are the varieties brought out, each claiming to have some special advantage, and most having also some disadvantage, generally discovered only by the painful process of experience. I will now take up a few points connected with windows internally—more especially as regards their fittings; and the first point is naturally the advantage between casements and hung sashes. Casements are the old fashion, hung sashes are the comparatively modern one, and therefore it is generally assumed that hung sashes must be preferable; but I doubt myself

whether in many cases we shall find them to be so, and that a combination of the two might be advantageously used.

(*To be concluded.*)

FACTORY CHIMNEY SHAFTS.

IN a recent paper read by Mr. R. M. Bancroft before the Civil and Mechanical Engineers' Society, some practical details on chimney construction are given. Referring to foundations, great care is necessary to insure an equally resisting bed upon which to build, and the author wisely suggests the importance of boring so as to insure this condition. Concrete may considerably aid in spreading the pressure of a lofty shaft over a large area, but the pressure of wind exercising a considerable leverage has caused many chimneys to lean or topple over. A gale often strikes a shaft, causing one part of the foundation, the leeward side, to sustain a pressure considerably greater than the normal and vertical weight of the shaft, and numerous instances are on record where stacks from this cause have become considerably deflected from the perpendicular. There is greater risk from a gale of wind when the mortar is not solidified. An instance of the effect of a gale on a lofty chimney is given by Mr. Bancroft in the Townsend Chimney, Port Dundas, the height of which is 468ft. to top of coping. It was designed by Mr. Robert Corbett, of Glasgow, for Mr. Joseph Townsend's Chemical Works. No piles were used in the foundation, which is built on "blue till" or clay of rocklike compactness. The footings consist of 30 courses, brick on edge, the lowest being 50ft., and the topmost course 32ft. diameter, and the erection of the shaft was carried on from July, 1857, until October, in 1859, in three seasons. The inside lining is of 9in. firebrick, and 60ft. in height, built distinct from the chimney with an air space between covered on top to prevent dust from falling in, but built with open work in the upper four courses to allow air to pass into the chimney. The shaft is coped with vitrified "till" flanged over wall of chimney and jointed in Portland cement. Iron hoops are built in at intervals of 25ft. in height, and the thickness of the chimney wall varies from 5ft. 2in. for the first 60ft. of height to 1ft. 2in. for the last 20ft., and the sections are in 30, 40, and 52ft. heights. In September, 1859, the chimney was struck by a gale which caused it to sway, also the scaffolding on one side to give a little, and had not the process of sawing been promptly commenced, it is thought that the chimney would have fallen. By this process the shaft was restored. The shaft is protected from lightning by two copper-wire conductors, ¼in. thick, placed on opposite sides, joined to one pike, fixed over the top; which, however, have not prevented damage to the shaft by the electric discharge on several occasions. The ordinary pressure of chimney-shafts on the the foundations may be taken to be from 5 to 10 tons per square foot. Various chimney-shafts are mentioned, in which a deflection has taken place, the ordinary means of restoration to the vertical being by making saw cuts on the side of shaft opposite to the inclination. Another and often more practicable plan in thick shafts is to remove a layer of bricks on the required side, replacing it by a thinner layer at different intervals in the height of shaft. Care should be taken, however, not to make the slits too wide, or an inclination is produced in an opposite direction to that intended to be rectified. Another plan has been to weight the foundation on the side opposite to the deflection, and one successful case is mentioned. Messrs. Edward Brooks and Sons' chimney, of the Fire Clay Works, Huddersfield, is of fire-clay, 330ft. high, the shaft being 27ft. diameter at ground, and 12ft. at top, outside. The proprietors recommend one regular batter from bottom to top, that no stone should be used at the top of chimneys where acids are emitted, and that any overlapping should be formed by hard-burnt radiated fire-brick, 14in. by 5in. by 3in. In the North of England cavity chimneys are often built, in which the inner ring is carried up vertically of 4½in. fire-brick for 20ft. or 30ft., the main outer shaft closing with it as it diminishes or batters to the top. The outer shaft is often 14in. thick at the base. We cannot here detail the many other useful particulars furnished by Mr. Bancroft in his instructive paper, in which he classifies about forty chimneys, giving the height, diameter, diminution of shaft, weight in tons, number of bricks used, cost of erection and scaffolding, the architect or engineer's name, and the time occupied in building. Many of these particulars are incomplete, but the data given will be found useful by all builders of this class of erection.

ARCHITECTURAL & ARCHÆOLOGICAL SOCIETIES.

BRITISH ARCHÆOLOGICAL ASSOCIATION.—The first meeting of the session was held on Wednesday last; Mr. Thomas Morgan, F.S.A., in the chair. It was announced that the memorial of the Council to the Corporation of South Shields, for the preservation of the Roman station recently excavated at the Lawes, had resulted in the safety of the remains. The subject had been warmly taken up by the local antiquaries; the Ecclesiastical Commission had given a part of the freehold site, and the Town Council had voted funds for enclosing the land thus acquired by the town. Mr. S. Tucker (Rouge Croix) exhibited a remarkable bronze canette of Dutch workmanship bearing the arms of Philip II. of Spain, and the date 1573. It was purchased at Keswick. Also a silver cup from Venice. Mr. Earle Way exhibited some interesting London antiquities, and Mr. Roofe described a perfect amphora without handles found in Queen Victoria-street. Mr. Bowman forwarded a grant of Cecilia Pollard, of Bristol, early fourteenth century, of two shillings yearly for supply of oil to the lamps of St. Laurence, Bristol. The Rev. S. M. Mayhew described a large club of limestone found by him in an early British camp in North Wales, and which had evidently undergone the action of fire. Mr. Loftus Brock, F.S.A., produced some perfect Samian ware vessels from the Pan-rock, Whitstable, and described the locality. Mr. R. Blair reported an important discovery on the site of what is probably the cemetery of the Roman Station, South Shields. It is a sepulchral monument representing a seated female figure, beneath an arch and pediment, supported on pilasters with capitals. The whole is very well executed, and the figure is about life-size. Mr. De Grey Birch, F.R.S.L., described the peculiarities of the Latin inscription, which set forth that the monument was erected in the second or third century by Barates-a-Palmyrene to the memory of Regina-a-Catwablanian, first his freedwoman and then his wife, who died aged 30. Interesting as this monument must be considered from the beauty of its design, and the evidence it affords of the presence of an Asiatic at the extremity of the Roman dominions; yet these are surpassed by the presence of a Palmyrene inscription beneath the Latin one, the first found in England. Prof. Wright has read this as "Regina, the freedwoman of Barates Alas." Mr. G. G. Adams exhibited a remarkable Egyptian amulet, and the Rev. C. Collier reported the discovery of a third Roman pavement in a perfect state at Itchen Abbas. The proceedings were brought to a close by a paper by the Rev. S. M. Mayhew, who described the antiquities of Winlborne, Lincolnshire.

NORTHERN ARCHITECTURAL ASSOCIATION.—On Tuesday afternoon the ordinary quarterly meeting was held in the Old Castle, Newcastle-upon-Tyne, Mr. F. Charlton, in the absence of the president, occupying the chair. Mr. William Livesey, architect, Raby Castle, was proposed for membership. The memorial praying that Old Carliol Tower, one of the last relics of the town wall, should not be removed as proposed by the Town Improvement Committee, was signed by all the members present. It was announced that a deputation had waited upon the Town Council in September last with reference to the employment of the borough engineer in the capacity of architect for the several public works, the mayor kindly promising to forward the memorial to the proper authority, but as yet no answer had been received. The hon. secretary (Mr. W. H. Dunn) then read a paper on "Concrete," describing the many forms in which it could be used in building construction, showing its adaptiveness for foundations, and fire-resisting floors and roofing, and the possibility of a much more general application of the material. In accounting for the shyness which the public had for concrete work, he thought that the early promoters had much to do with the false impression, their great argument being "cheapness and expedition," and this naturally seemed allied to "jerry work." From his own experience concrete was neither so very cheap nor yet so expeditious, its virtue consisting more of "utility and usefulness," and, instead of being so expeditious, was in reality a slow setting material, and where treated in its true and legitimate way was most reliable. Referring to the expansion and contraction of concrete, he showed that the alterations in the material, even though just perceptible, showed that when used in the form of an arch there was a certain amount of thrust, notwithstanding the opinions of many writers to the contrary. Under the head of "Flooring" Mr. Dunn referred to the several works in which he had introduced concrete for large spans, mentioning that he had recently executed a floor having a clear span of 21ft. by 18ft. 6in., without any intervening supports. In describing the application of different kinds of concrete he stated that for malting working floors he had lately used a compound of riddled marl, lime, and Portland cement, which, whilst forming a durable floor, also retained and gave moisture, thus assisting the growth of the malt. The paper was illustrated with working drawings of works executed. An interesting practical discussion followed; and a hearty vote of thanks was given to Mr. Dunn for his paper.

The chancel of the parish church of Cople, near Bedford, has been reopened after partial restoration from the designs of Mr. G. Gilbert Scott, M.A. A new panelled roof has been erected, and a new east window; the choir and return stalls have been replaced in their original positions, and an altar of oak with stone slab erected, and three new windows inserted in the chapel on the south side.

It is stated by the *Surrey Gazette* that steps are being taken for letting a portion of Banstead Downs on 99 years' building leases, and to reserve part of the area as an open space for the use of the public.

The work of restoring Inveraray Castle, so far as damaged by the fire that occurred last year, is now in full progress, a force of about 100 workmen being busily engaged in it. The contractors are Messrs. George Smith and Co., of Pimlico, London. A slight increase of the elevation is also being made, and there will be a sloping roof instead of the former flat or platform roof. The corner turrets are to have conical roofs.

The memorial stones of a new Welsh Calvinistic chapel, schools, and chapel-keeper's house, in course of erection in Broad-street, Pendleton, Salford, were laid on Saturday last. The buildings will cost between £5,000 and £6,000. Mr. William Dawes, of Manchester, is the architect, and Messrs. Kewley, Jones, and Robertson, are the contractors.

Messrs. Utley and Gray, engineers, &c., of Halifax, have been instructed by the Sowerby Bridge Local Board of Health to prepare plans for dealing with the sewage—an inquiry lately held by Mr. Harrison, C.E., on behalf of the Local Government Board, having shown the urgent need of intercepting the sewage from the River Calder and its tributaries.

The new chime clock and carillons which have been erected in the tower of the Abbey Church, Evesham, by Messrs. Gillett, Bland, and Co., of Croydon, were publicly opened on Friday.

The Croydon School Board determined last week to purchase land in Katharine-street for the erection thereon of offices, to be designed by their architect, and to cost not more than £1,300.

Buckland Newton parish church, a fine Late Perpendicular edifice, was reopened a fortnight since, after restoration from the designs of the diocesan architect, Mr. T. H. Wyatt, of London. New roofs have been placed upon the nave and north aisle, a panelled ceiling has been fixed in the south aisle, the unsightly west gallery has been removed, and the tower arch opened out, and the nave and aisles have been reseated and repaired, new warming apparatus provided, the windows reglazed, and new floors laid in ringing chamber and belfry. The north arcade has been rebuilt, as the work was much out of the perpendicular. The chancel was thoroughly restored nine years since from the designs of the same architect. The work has been carried out at a cost of £2,000 by Mr. Trask, of Norton-cum-Hamdon.

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THE "CAMDEN TURKISH BATHS," CAMDEN-TOWN.

THESE buildings, which were opened last night, occupy a triangular site in the rear of two rows of new houses and shops, fronting High-street and Kentish Town-road respectively, the address being 11A, Kentish Town-road. The baths have a frontage to the road of about 7ft. only, and are approached through a corridor 45ft. in length, and entered by a pair of wrought-iron ornamental gates, having the title of the baths and date of their erection in a circular panel. The upper part of the entrance consists of a perforated wrought-iron box forming a Moorish arch, inclosed with coloured glass, with the crescent and star thereon, and inside of which are gas burners for illuminating it. The iron arch work rests upon two polished grey granite incised and gilded pilasters, with carved stone caps supporting a pair of stone shafts, from which springs the stone pediment above. On entering the gentlemen's bath on the first floor is the office, ante-room, and an undressing-room, fitted with boxes around three of its walls, and lighted with stained glass windows. A pitch-pine staircase leads to a similar undressing-room over it, lighted by means of a lantern of pitch pine and rolled glass. On descending another flight of pitch-pine stairs, from the undressing-rooms to the ground floor, the hot rooms are approached. No. 1 hot room (tepidarium) is 24ft. × 20ft., and 11ft. high, fitted with marble slabs on white-glazed brick risers, and also marble backs and turquoise brick strings, above which the walls are stuccoed, and decorated with floral and scroll ornament in panels. The ceiling is similarly decorated. The light to this room is obtained from the ceiling, and the floor is tiled. No. 2 hot room (calidarium) is 16ft. × 12ft., fitted in a similar manner to No. 1 room, but the floor of this room is cemented, and the room lighted by a figured glass window of three lights. No. 3 hot room (laconicum) is 8ft. × 7ft., is lined throughout with white glazed bricks with a tile ceiling, and is raised three steps above the level of the other rooms. In the floor is fixed a cast-iron grating, up through which rises the heat from the generating room and furnace below (hypocaustum), which in No. 3 room rises as high as 230°, the average temperature, but capable of rising considerably to over 300°. The hot air passing through the door to No. 2 room, heats the above room to about 180°, the average temperature, and then to No. 1 room, where the heat is reduced to 130°, and in some parts of the room it is only 110°. The shampooing-room adjoins No. 1 room, and is 20ft. × 15ft., around which are Sicilian marble seats and marble backs to a height of 3ft. 6in. The turquoise brick string is also continued around this room and above it. The walls are lined with Athenian marble in panels of dove colour and Irish red margin, with a cornice of Sienna marble, the floor being laid with tiles. In this room are the necessaary marble bowls fixed in the walls, with hot and cold water laid on to each, also in a circular zinc inclosure, against one side of this room, are secretly fitted most of the special baths—viz., the shower, douche, spray wave, and rose, and ascending douche and spray, all of which have the hot and cold supply so arranged that they can be mingled, and any and every degree of temperature obtained. From this room is entered the swimming bath, 30ft. × 20ft., and 17ft. high, with tile platform to plunge from, the bath itself being lined with 6in. square tiles of four colours, white, buff, and blue, and chocolate in pattern, and turquoise and chocolate strings, the bath being respectively 4ft. and 5ft. deep. A 3ft. tile dado surrounds the bath. Above the dado the walls are finished in Keen's cement, and ornamented in panels and colour. There is a w.c. and urinal on the bath-landing, also a platform overhanging one side of the bath, leading to a pitch-pine staircase at the further end for bathers who do not wish to plunge or swim through the bath. These stairs ascend from both sides of the bath, and meet on a landing, and arrive at the centre flight leading to the cooling room above. The cooling room is 40ft. long, and 20ft. wide, and about 20ft. high to the lantern, which is 7ft. wide, and extends the length of four bays out of the six which occupy each of the two sides of the room. The ends of the room occupy three bays each. This room is lined from floor to the lantern with polished Athenian marble of various colours. The dado is 2ft. 3in. high, the string of which is Egyptian green, the die jasper in the pilasters, and purple vein in the recesses, and the plinth of Bordella. The ladies' bath is entirely on the first floor, but is considerably smaller than the gentlemen's bath. From the landing is entered the ladies' ante-room, triangular-shaped on plan, lighted by a bay window, which projects into the hall, glazed with antique coloured glass. From the ante-room is entered the dressing-room, partly fitted with boxes and partly with couches appropriately decorated. Through this room is approached a tiled lobby leading to the first hot room, 15ft × 10ft., and 9ft. high, fitted with marble seats, and decorated similarly to the gentlemen's hot rooms, with tiled floors and ceiling light. The No. 2 room is 9ft. × 8ft., fitted with wooden seats, under which the heated air enters the ladies' bath, and by means of valves the temperature is nicely regulated. Returning through No. 2 hot room and the lobby, the shampooing-room is entered with tiled floor, and fitted marble seats and backs, and painted walls, antique glass windows, and fitted with precisely the same arrangement of shower, douche, spray, wave, rose, &c., as in the gentlemen's shampooing-room. The glazing of the various partitions, sashes, and doors throughout the building is with tinted cathedral glass of various designs, both plain and ornamental. The ventilation has been very carefully provided for. The cold air is admitted into the cooling room by means of perforated panels in the sides of the lantern, with external flaps to regulate the same, and also by means of an appliance made purposely by Mr. Elsley, which from an adjoining room opens six panels or sashes all at once on the top of the lantern, and which can be nicely regulated. The heating apparatus is by Mr. Thomas Whittaker, of Bolton. The bath fittings, including the special and private baths, have been carried out by Messrs. Smeaton and Sons, of Moorgate-street, but the other plumbing work generally has been done by the builder. The total cost, exclusive of site, is about £5,500; Mr. J. R. Hunt, of St. Paul's Works, Bow-common, is the contractor, the whole having been carried out under the personal superintendence of Mr. H. H. Bridgman, architect, of 42, Poultry, E.C., and 71, Park-street, N.W.

CHURCH OF ST. PETER AND ST. PAUL, UPTON-ON-SEVERN.

THIS church is being built to meet the increasing requirements of the place—the old church, erected about 120 years ago, being too small, and not capable of satisfactory enlargement. The new church is Second Pointed in character. The walls are faced with Bourton-hill stone, with quoins of the same—the window dressings, &c., being of Bath stone. It will be seated for about 750 adults. The total cost will be about £9,500. The contractor is Mr. Thomas Collins, of Tewkesbury. Mr. A. W. Blomfield is the architect.

THE NEW RATHHAUS, HAMBURG.

CERTAINLY the two most important drawings exhibited in the gallery devoted to architecture at the Royal Academy this year, were the large perspective views illustrating the late Sir Gilbert Scott's designs for the new Town Hall at Hamburg. We reproduce one of these to-day—viz., that showing Sir Gilbert's alternative design, which, as will be seen, is treated in the style of the Renaissance, based, however, as a whole, upon the lines determined by the Gothic design, for which Sir Gilbert Scott obtained one of the premiums in the competition, and which we illustrated in the BUILDING NEWS for Oct. 4th last. We have already given our preference to the alternative design, though we believe the author chiefly relied upon his Gothic design for the prize. It will be remembered that Sir Gilbert was the selected architect for this building in the original competition some years ago, and we know how keenly he felt that which he considered to be the injustice of the award in the more recent competition—so much so that he refused to let his drawings see the light on their being returned to him. We are glad, however, that they have been exhibited to the public, and that we are enabled to put them upon record in justice to his memory. Our drawing to-day is the work of Mr. W. S. Weatherley.

NEW NATURAL HISTORY MUSEUM.

FOLLOWING up our series of details from the New Natural History Museum now approaching completion at Kensington, we publish to-day the elevation of the south wall of entrance hall with enlarged detailed sketches from the building itself, showing the terra-cotta ornamentation. The arch, with the staircase over, is also at the south end of the Index Museum, as will at once appear by referring to our section of the hall recently published in the BUILDING NEWS, where a section of the arch is given. The several details of the balustrade and stairs are the same as those at the north end of the hall, published by us last week. Mr. Alfred Waterhouse, A.R.A., is the architect. Our next illustration will be the general drawings of the main entrance.

WINDOWS AND THEIR TREATMENT.

SEE report of Mr. Aston Webb's lecture before the members of the Architectural Association on p. 555.

SCHOOLS OF ART.

CHESTERFIELD.—The prizes and certificates were presented to successful students at these schools on Tuesday last. The first annual report congratulated the subscribers on the hopeful commencement of a school, both on the ground of numbers of students and amount of grant earned. 132 students joined the schools, of whom 41 were successful at the Government examination, and took 47 certificates and 11 prizes. It was decided to form a local prize fund as a supplement to the Government awards.

The Local Government Board have sanctioned a loan of £1,330 for making new streets, flagging, &c., in Old Goole, from plans prepared by Mr. E. C. Buchanan Tudor, town surveyor.

The new South Western passenger station now in course of completion to the south of Waterloo Terminus has been officially inspected by General Hutchinson, and will therefore be opened for traffic on Sunday next, the 1st prox. The whole of the Hampton Court and short main-line suburban passenger traffic will be worked from the new terminus.

Bethesda Chapel, Eiland, West Riding, is about to be rebuilt from the designs and under the superintendence of Mr. Wm. Hill, architect, of Leeds.

A "Cocoa Tree Tavern" was opened in High-street, Lowestoft, on Saturday. The building is of white bricks, and Bath stone dressings. The lower room is 36ft. 6in. by 20ft. 6in., and 13ft. high, and will be used as a refreshment room and bar. Above is a lecture-room, 36ft. by 26ft., and 13ft. high, seated with pitch-pine benches. Mr. George Glover, of Lowestoft, was the architect, and Messrs. Wilkins, of Norwich, the contractors.

Church of SS. Peter & Paul, Upton-on-Severn, Worcester.

A. W. Blomfield Arch^t.

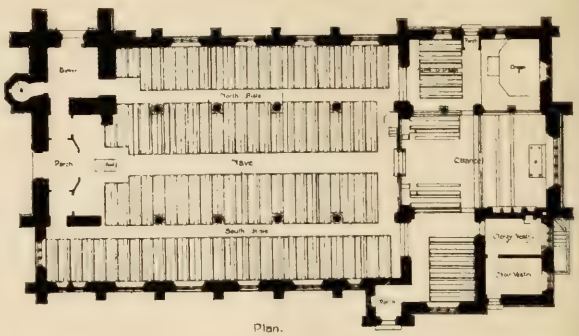
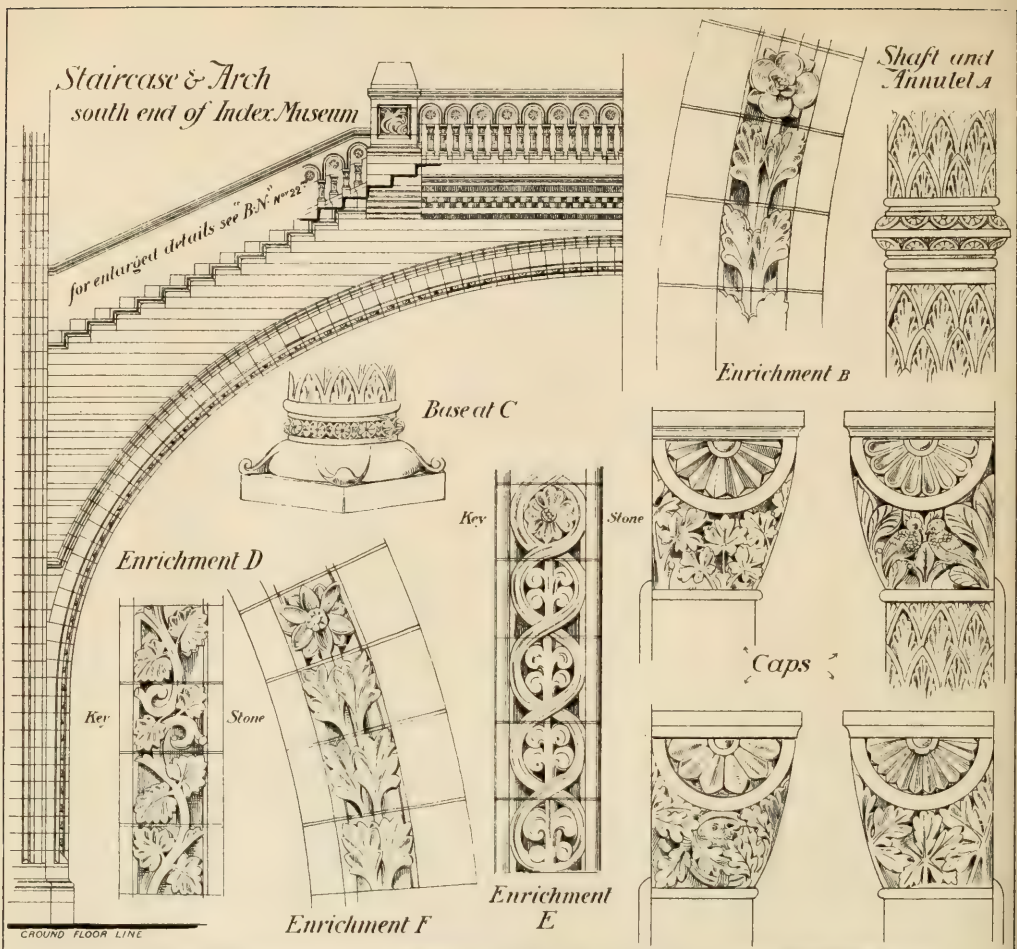
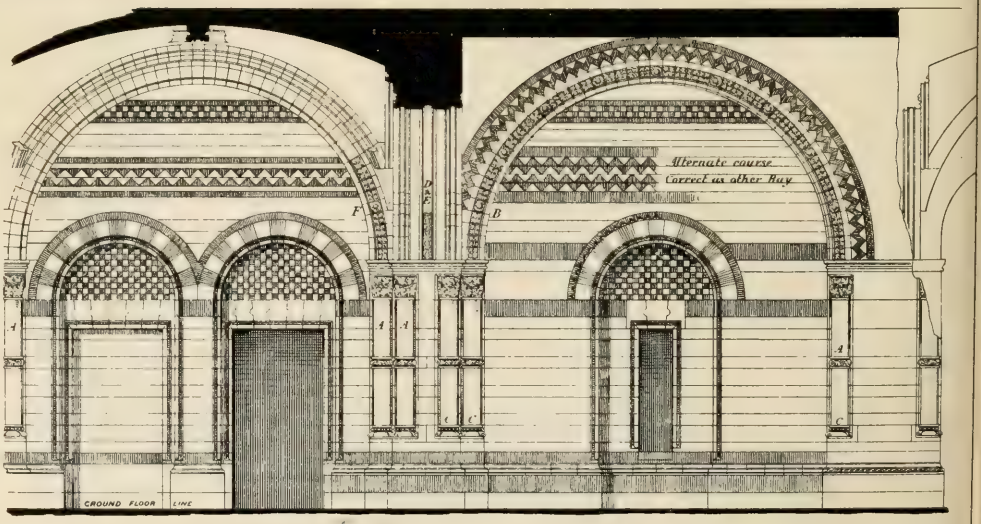


Photo Lithographed & Printed by James Akerman 6, Queen Square W.C.





Elevation of South Wall of Entrance Hall and Details

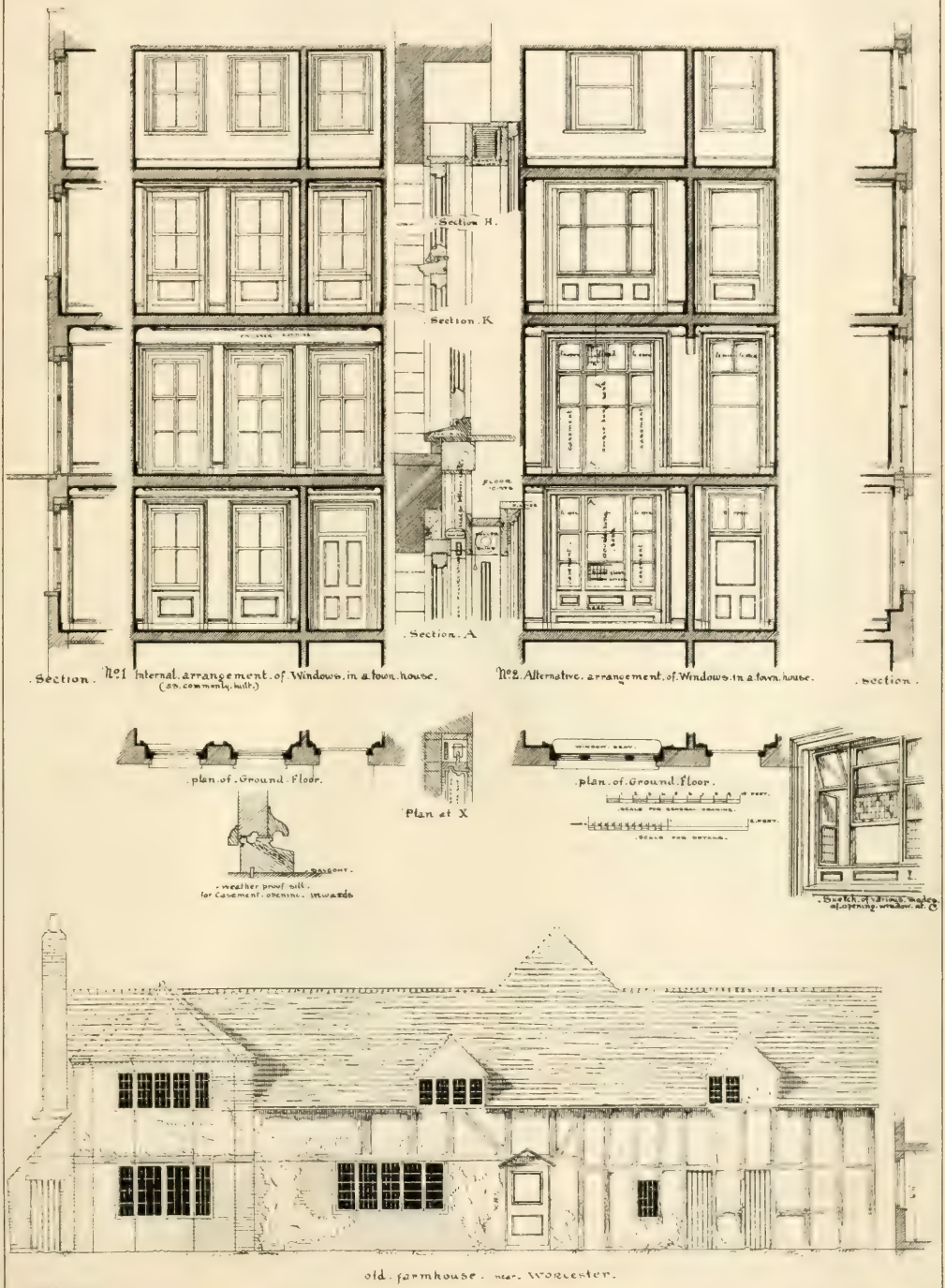
NEW·NATURAL·HISTORY·MUSEUM·S·KENSINGTON

A·WATERHOUSE A·R·A· ARCHITECT

MAURICE B ADAMS DELT. *Scale of Feet* 5 0 5 10 15 20 25

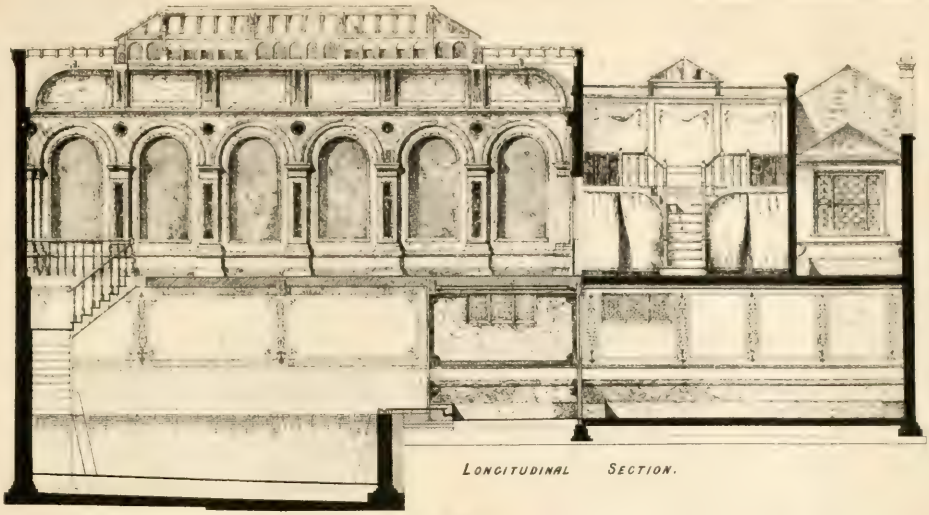
Photo Lithographed & Printed by James Akerman, 6, Queen Square, W.C.

"WINDOWS and their treatment."



Akerman Photo lith London

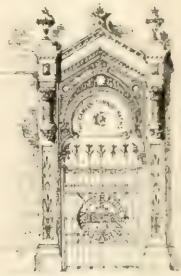
Examples illustrating Paper by ASTON WEBB



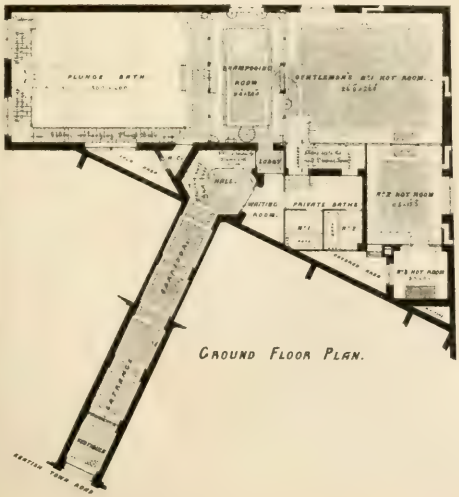
LONGITUDINAL SECTION.

SECTION ON LINE C-D.

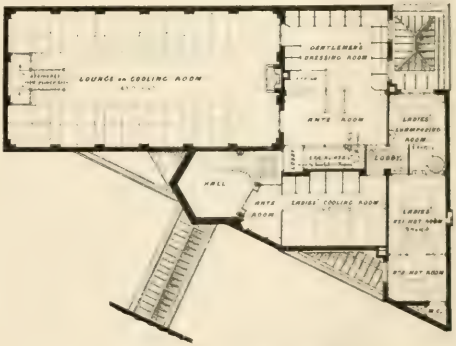
SECTION ON LINE E-F.



ENTRANCE FROM KENTISH TOWN ROAD.



GROUND FLOOR PLAN.



FIRST FLOOR PLAN.

THE CAMDEN TURKISH BATHS.
11, KENTISH TOWN ROAD, LONDON N.W.

Photo-Lithographed & Printed by Ashford & Lucas, Square W.C.

BUILDING NEWS DESIGNING CLUB.

REVIEW OF DESIGNS FOR A VILLAGE CLUB-HOUSE.

THE designs submitted for a village club-house comprise a few clever attempts at picturesque sketching, but the plans are generally not so well studied as we could have desired. "Triangle in Circle" sends a design marked by such a combination of external treatment and planning that we are inclined to place it first, not from any great merits it possesses in design, but rather for its avoidance of extravagances in style. In plan, the accommodation is pretty complete, but the arrangement not faultless. We think the staircase and landing to meeting hall too cramped for the use of hall, which is 40ft. by 20ft., and the foot of stairs projects rather awkwardly in the hall, which should have been somewhat larger and square. This could have been very easily done by cutting out a square recess from the bar instead of canting it, and the hall might then have been made a feature which it is not now. On the other hand, the billiard-room is well placed as a projecting single story building, 24ft. by 18ft., with a bay window end and top light, and can be served readily from the bar without inconvenience to the readers in library or newsroom, which are placed on the left side of entrance. The dining and smoke room is a useful addition, but not large or ventilated enough. The kitchen and offices, with bedroom above, are well placed, and are roofed independently at a lower level. The hall above is 40ft. by 20ft., with a committee or retiring room behind and a separate entrance from stairs. In external design the author has adopted a simple domestic timbered treatment, but has, like many more, curiously failed to give a public character to his hall. This he might have done by carrying up two loftier and gabled windows in the positions of the small and inadequate casements and dormers shown to light the hall. The upper dormer windows express more a bedroom to a cottage than hall lights supplementary to the lower openings. "S." in circle, who runs "Triangle" in circle very hard, has succeeded in giving external expression to his meeting hall, which occupies the whole front on the first floor, and is well approached with necessary conveniences. On the ground floor the hall is made a centre, the refreshment-bar on the left side—not so convenient as the right side—a library right-hand of entrance, with separate lobby for borrowers, and the conveniences commodiously planned. The billiard-room is entered from a door in centre of hall. It is roofed low and lighted by a skylight. The elevations are carefully drawn. The cubical contents are 59,724ft. at 6d. = £1,493. "Yestam" has some merits in plan and elevation. The refreshment counter is placed within the hall, with kitchen at back. The stairs are at end of hall. On the right is the meeting-hall, with a lobby, &c., and committee-room in the rear. What induced the author to project the meeting-hall so much in front we cannot imagine, as it would have been much better to have made the break just enough to protect a porch. This and the public entrance to the hall in front we consider objections to the ground plan. The billiard-room above the hall would have been better lighted from the top, and the library is too close to it, and its approach bad. The elevations are in a suitable timbered style, but the gabled balcony with seats in front of billiard-room, though a pleasing feature, would, we are afraid, become a place of noisy gambling. Cube contents, 51,600ft. at 7d. = £1,505. "Curiose" has a pleasing elevation, with hall gabled, and its end to road. The plan is simply arranged, the refreshment-bar and kitchen being placed below the assembly-hall, and the reading-room below the billiard-room. The bar is too large for a village club-house, and the committee-room on a second floor is not convenient. On the whole, we consider the design an appropriate rendering, but the cubing at 6d. is below the mark. "Mechlin" makes an extremely long frontage by placing the assembly-room and committee-room lengthwise, projecting it from the library and attendants' rooms as a single-story building. The fault is that the plan occupies a much larger area than necessary, and the roofing is uneconomical. Examining the plan we do not find much to find fault with. The library on the left side of the entrance-hall is convenient, with cloak-room and lavatory behind; the billiard-room above, lighted by a skylight, though very indirectly, and end window is suitable, but we find no refreshment-bar near the entrance or landing, but an apology for one in a recess to the billiard-room. We find also no conveniences for cooking club dinners, and these are rather fatal objections. The elevation is half-timbered, simple, and unpretending, though rather suggestive of a village school. Drawings are very commendable. The cubic contents are 59,885ft., cubed at 6d. "Anglesea" places his billiard-room and refreshment-bar on the right, and his library on the left of entrance. The former is ill-lighted, and the circulating library not very conveniently placed. The staircase to the meeting-hall is somewhat cramped, and the windows are certainly objectionable, to say nothing of the unnecessary size of hall, which is 48ft. by 26ft. No provision is made for cooking. Externally the design has merit, and the hall is treated in a sensible manner with a row of four large-hipped dormer windows, the spaces between being half-timbered The detail is appropriate. Cubing is 55,384ft. at 6½d. "St. Lucy's" plan too much resembles a half-timber cottage or schoolhouse; the library has an inconvenient entrance, and the bedroom between it and kitchen, with inner passage, which together with the hall, must be ill-lighted, are not well disposed. The stair approach to the hall, which is not made a feature to the road, is too cramped. With these reservations the external design displays some taste. Under motto "J." we have a set of plans irredeemably bad, showing either carelessness or incapacity. How is the hall lighted; and why place meeting hall at the back? The elevation in a pleasing timber treatment atones for the defective plan, and exhibits ability, but it is a little too rustic and over-timbered. We recommend "J" to give more attention to his planning. "Omega" in circle, as usual, sends an over-laboured design, clever in parts, and displaying no mean knowledge of detail; but his plan covers twice the area demanded, and the assembly and billiard rooms placed behind are disposed in a very uneconomical manner. The hall, refreshment-bar, kitchen, and smoking-room are conveniently located, the library and reading-room being upstairs, with necessary offices. The elevation is half brick, and timbered above, and if two or three such windows as is shown to the library had been given to a front hall extending the entire frontage, or nearly so, we should have liked it better. The assembly and billiard-rooms are priced out at 4½d., and the front portion at 7d. "R in Circle" sends a design with undoubted marks of ability in the elevations, but the plan would be better suited for a private house than a village club. One feature he has provided that others have not thought of—viz., a good dining-room, with kitchen adjoining, the bar occupying one side of hall. The defects are the narrow entrance, nothing characterising it as a public one; the position of library, better placed in a more retired position; and the arrangement of meeting hall transversely to the site. "Knighton" sends a crude arrangment — the billiard-room is too large, and the stairs and landing to assembly-hall and library much too cramped. There are some good features in the elevation, however, which is handled in a suitable manner, and the cubing and pricing are satisfactory, the main front portion being cubed at 7d., and the minor portions at 5d. One very economical plan is that by "Omnia Vincit Labor." The hall and refreshment buffet are compactly arranged, with library and billiard-room at side, and upstairs a meeting-hall over both, the kitchen offices being in a basement. An obvious objection exists to the last arrangement by the necessity of bringing everything through the front hall if a dinner was served above. Elevations in Gothic timbered are more suitable than some, and the cubing is at 9d.—a very good price. A suitable elevation, though rather ornate for a village, exhibiting some careful detail, is that of "Frappe Fort," but we cannot look at the plan, which has a very haphazard and ill-studied disposition, and the billiard-room is badly lighted and placed. The cubing, at 5½d., is too small. Another very carefully drawn set of elevations are those of "J. S." The great fault is that there is too much of the village school in the conception, and the entrance and relative positions of library and billiard-room are conspicuously defective. The plan of "Spero Meliora" wants sadly the virtue of compactness, though there are one or two good points in the service arrangement, and the drawings are carefully executed. A similar remark applies to "Enigma," whose ideal is a Gothic cottage, grouped for effect, and possessing nothing to stamp it. All that we can say is that it is pretty, but not suitable. "Confido" is very compact: the service-rooms are generally good, but the billiard-room at top of building in roof, and the external treatment are scarcely indicative of a village. Great care and some good details are exhibited under the motto, "Brutus," but the arrangement and elevation are not suitable. "Frappe Fort," No. 2, is far behind No. 1, the plan being hopelessly wandering in the latrines and offices. "Cyprus" is too much of a villa both in plan and elevation, though tolerably compact. "Cleo" is in a marvellous style—a hybrid of Jacobean and Egyptian features—and the plan is not neatly arranged, though the drawing is commendable. "Semper Spiro Spero" has a suitable elevation, and if the plan had been more convenient as regards access to bar, it would have taken a higher place. We have not space left to describe other designs, but we may enumerate them in the order of their merit. "Jac" (poor plan, and with elevation reminding us of a pleasure-garden pavilion), "Design" (ill planned), "Such a Dog" (unclub-like), "M," between leaves, "North West" (extravagant), "D" in triangle, "Prenez Garde," "Con Amore," "Semper Fidelis," "C" in triangles, "East Anglian" (too stable-like), "Peter" (plan worse than elevation), "Advance," "Nil Desperandum," "B. M. W." (elevation suitable, but bad plan), "Cabul" (fair elevation spoilt), "Montague" (more fit for a school), "Signum," "Tam o' Shanter," "Amphion" (elevation below par), "Chimney Pot" (why such elaborate carving in front?), "Dagger" and "Through" (too flimsy in elevation), "Ich Dien" (try again), "Maltese Cross," "Try" (why such fantastic timbering?), "Thor," "Ogmore," and "Iota." Of these, as of some mentioned before, one common error has been a neglect of the club-hall as an external feature, and consequently of falling upon a too domestic treatment. Another common defect has been placing the billiard-room too near the entrance and library, want of easy access from refreshment-bar and kitchen, awkwardly-placed conveniences, &c. Many exhibit also defects of construction and detail into which our space precludes our entering. "Mechlin" sends some suitable details for doorway and treatment of timbering. The upright timbers or studs are filled in with plain and herring-bone brick nogging; the lead work is well shown with provision for wet to escape that finds its way through the brick nogging. The details of mullions, iron barges, &c., are simple and effective. "Frappe Fort" (No. 1) ranks next in order of merit, but is wanting in clearness, as for example the ornamental parget work. The half-timber work is shown with fillets fixed to uprights inside and outside, and two skins of plaster with hollow between. Inside the studs are battened and plastered. "Spero Meliora:" The detail of front window is fairly shown, but the mouldings are too fantastical. "St. Lucy's" detail of hall roof is very weak at the angles between principals and cross-braces, in spite of the angle blocks bolted through; the fireplace is suitable. Details by "Enigma" admit of much improvement; the cross-boarding to entrance-door is fanciful rather than tasteful, and the mouldings are not clearly shown. "North-West:" Mouldings show want of knowledge of stonework. "Amphion:" Detail too lumpy. "Ogmore," "Thor," and "Try" all indicate weakness and non-acquaintance with construction and practical work, and we can only advise them to consult good works, and to look before they leap.

The tender of Messrs. R. Gill and Son has been accepted for heating St. Peter's Church, Thetford.

BRITISH AND AMERICAN ANONYMOUS CRITICISM.

ON p. 520 we gave an extract from a London letter contributed to the *American Architect and Building News*. The letter itself has aroused the indignation of the editor of a contemporary, and his statements have called forth a letter from Mr. Burges, which we print in another column. We have nothing to do with the quarrel between the English architect and his critic, but Mr. Burges is certainly entitled to the opportunity of denying the imputations made with regard to himself. Other readers will probably like to read the whole of the letter which appeared in the *American Architect*—so we comply with Mr. Burges' request and reproduce it:—

Is Queen Anne dead? asks a lively writer in a recent number of *Truth*, as he despairingly bewails her influence in all the English furniture at the Paris Exhibition. However it may be for furniture, after a sincere search about London I am convinced she is dead as regards architecture. Not only is she dead, but so few and indistinct are the footprints the good queen left behind her that almost any foot will fit them, and there are plenty of masqueraders at present capering in them. If the prevailing fashion introduced by the mania for bric-à-brac were called the anonymous style, it would be comprehensible; but then it would not sound so well, and in England at least everything is in a name. Anything which is not identified with the late Gothic revival is boldly appropriated for this "pot-pourri" of architecture. Although the spirit of annexation is rampant here at present, I was not prepared for the following proof of it. Wishing to look up what books there were on this Queen Anne's style I went to Batsford's, the architectural bookseller's—strangely enough his modest shop in High Holborn suffices for the whole London profession—and there was told; "Oh! we have no books on that style. Our Queen Anne architects take their details from Sauvageot's work on the French chateaux!" Hence "Queen Anne" on the *lucus a non lucendo* principle.

Houses, however, were built of course during the reign of this personage; and at Chelsea I found a row of bona-fide Queen Anne houses looking upon the Thames, across a strip of trees and verdure. The striking characteristic of these dwellings in Cheyne-row lies, to use a contradiction, in their anobtrusiveness—certainly not a quality of their recent namesakes. A plain brick front of two or three stories, with flat sloping roof and simple cornice, is enriched by a wooden porch with a classic order and delicate mouldings. Nothing could be more simple and commonplace; but there is a decided charm in these quiet homes, which is wanting to yonder block, fortunately for comparison in the extreme present fashion. Their narrow and lofty fronts are carried still higher into exaggerated gables, while tall, narrow windows suggest the view on a back-yard, rather than that across an animated river. The first tendency of this style was in breaking away from the conventional modes of building, to allow common sense to express itself; but the desire to be original—perhaps I should say to be odd—has drifted it far to the leeward. In one group of these houses, by Mr. Godwin, an octagonal front is recessed, so that the side windows, instead of getting a wider oblique view, look upon the wall of the next house. The entablature runs, however, straight along the front of the two houses, and a brick architrave, without suggestion of archwork, is carried across the recessed corners. Of course there must be a hidden band of iron, but it looks most uncomfortable. In the next street the same architect has just built a house for Mr. Whistler, the painter. As they are both men who are nothing, if not original, something extraordinary was to be expected. The first result was so plain and ugly that the Metropolitan Board refused to grant a licence for it. It was then ameliorated enough to pass that most tolerant of critics. Its small front door opens directly on a landing of the staircase—an excellent way to break the necks of burglars, and of all who are not forewarned that their first step from the door will precipitate them headlong into the large atelier below. Not a bad feature in this latter is the segmental arch which divides one end of the room and the fireplace from the main part. This fireplace is in the present fashion, and has a small opening for the grate, while a wide portion around it is filled with tiles. As is often the case with eccentric designs practical questions have been neglected; and this first story, really a basement below the street level, has not been protected against the damp, and is found uninhabitable; while the china closet has proved fit only for a coal-bin, and the servants' room has been turned into the former. I quote these details to show where the present tendency to be original at all cost is carrying some of the best known men; for Mr. Godwin, besides being known as the editor of the *British Architect*, has done far better things than these later works. In such a melancholy little house I was not surprised to find on Mr. Whistler's easel "a asymphony in blue;" the wonder was that under such positive circumstances it was as vague as this vaguest of impressionists always is.

So much for the bad side which the effort after odd effects has introduced into these latest buildings. But good has come from the increased attention given to brickwork, for "Queen Anne" work abounds in flat pilasters and delicate mouldings in brick or terra cotta. The English have hitherto been far behind both the Germans and ourselves in the quality of bricks and the use made of them. There are very few buildings of fine face bricks in London, and their coarse porous ones, by absorbing soot, add to the dinginess of the city. Now, however, a finer quality is necessarily used in this new style, of which it is fair to mention the best examples. Many of these were built for painters, who are certainly appreciative of "Queen Anne." Away from the everlasting smoke and fog of the city, at St. John's-wood, Hampstead, Chelsea, and South Kensington, many painters have built. Close to Holland-park is a particularly interesting group of new houses, all of them original in design. Val Princeps and Leighton are side by side, in houses designed respectively by Webb and Aitcheson. A few rods off the leaders in the style, R. Norman Shaw and Stevenson, have built for Colie Hunter and Fildes. Next comes Mr. Burges's house, of which I will speak later, as he would be horrified to be classed with the "Queen Annes," though surrounded by them; for on the other side Watts has a house, by Cockerell. As these men, both architects and painters, if not all academicians, are regarded as the "immortals" of their professions, this group is full of interest, and the houses themselves are picturesque and homelike, and generally entirely of brick. In this same neighbourhood both Stevenson and Shaw have built several handsome and characteristic dwellings. The design of one, by the latter, published in the *Builder*, June 4, 1875, gives the best characteristics of the style. It is of brick, five stories, with lofty gable; the ground floor is recessed, and has slight wooden bay windows with tiny panes, such as one still sees in such old English towns as Canterbury. A fine business store by the same architect breaks agreeably the classical monotony of the city. From the late Gothic revival we at home are apt to regard London as of that style; whereas it is really the city in Europe where the "orders" are most used and abused. In the City there is hardly any exception to this endless Renaissance reproduction, and the latest are like the first.

Mr. Burges has spared neither time nor expense to make his house artistic, and only half the rooms are finished, so lovingly does he "potter" over the decoration of them. The house is of brick, with stone finish, and is picturesquely grouped, a round stair turret flanking the main gable towards the road. The entrance is at the side, through a richly sculptured bronze door. Though he is acknowledged as an authority on decoration I was told to expect the most violent colouring and contrasts, and so was not surprised at the brilliant tints of the hall, which is two stories in height, and is lighted by a large coloured glass window, with full-size flying figures. The stairs start from the hall, and disappear into the tower, and then emerge on a balcony above. The library is the only room as yet entirely finished, and is as original as beautiful. To use the last London "art" slang, it is "a symphony in gold." One-third the height of the room is taken up by a frieze of the deepest gold, a scroll pattern picked out with red. This would be glaring were it not skilfully led up to by paler tones of gold below. The wooden bookcases are of greenish gold, covered with painted figures in a mediæval style. Where the wall shows it is stamped with a red gold pattern. The ground of the painted ceiling has a deliciously soft golden tint, and it is hard to realise that this hue comes from contrast, for it is only the natural colour of the pine.

Mr. Burges is full of quaint mediæval fancies, which peep out unexpectedly on the painted furniture and walls. For instance, the library mantel has a deep frieze of a procession of figures in high relief, which turn out to be the parts of speech before the Tower of Babel driven back by a figure of Grammar. The conceit is ingeniously carried out. Thus two trumpeters, male and female, lead as the "personal pronouns;" behind them is a dog for "it;" after them comes a lady as "the verb," and the pages holding her train are "the articles;" a youth and maiden represent "preposition and conjunction;" at the end is a man starting back for "interjection." These and all the other decorative figures are most graceful and of high artistic merit. The mantel of the next room is admirably sculptured with the "Romance of the Rose." Upstairs is a mantel with "Jack and the Beanstalk." In the architect's bedroom there is such a flood of colour that the ground of the furniture is scarlet without its appearing too crude. Here fancy has been everywhere at work. Instead of shutters delicate gilded lattices of Eastern design close the windows, and the red marble basin is inlaid with silver fishes. It is this endless play of fancy and his fastidious taste which have, perhaps, kept Mr. Burges from competing more frequently for important buildings. The decoration of St. Paul's was at first confided to him, but on some interference of the committee with his ideas he promptly threw up the whole thing. He has the honour of being the only man in England who has built a "real live" cathedral, that at Cork, in the early French Gothic. His design for the Law Courts was the one most liked by the profession in general; but in the celebrated division of spoils which gave Barry the National Gallery, Waterhouse the Natural History Museum, and Street the New Law Courts, irrespective of their designs, he was left out in the cold. We can console ourselves that our competitions are hardly more unfair than those elsewhere. R.

ROOF MATERIALS.

THE discussion as to the merits of the various materials for church roofs still continues. Mr. John Young, jun., writes:—

It may be interesting to know the opinion of the late Sir G. Gilbert Scott as to the most suitable roof covering for a building such as St. Alban's. Lead as used at St. Nicholas, Great Yarmouth, copper as at York Minster, and slate at Llandaff Cathedral have each found an advocate, but neither zinc nor our old English tile has been deemed worth recommendation, yet I read in a series of letters addressed to me by Sir Gilbert Scott on the restoration of the chapel of St. Etheldreda, Ely-place, as follows. In March, 1876:—

"Zinc will be the lightest covering. My own impression is that it will stand if thick enough. I examined some years back roofs at Brussels, Cologne, &c., and came to this opinion. There seems to be an incrustation of protecting matter which forms on its surface. I came to the conclusion (rightly or wrongly) that our error had been the small thicknesses we had used, and that it should be 22oz. to the foot. In appearance the sheets should be narrow (2ft.), and the seams of some form, not too unlike an old leaded roof. If all this could be secured and durability assured I think it would be the best covering next to lead."

Again in September:—

"I have been thinking over the question of covering at St. Etheldreda's, and am much puzzled. Lead and tile are the two old materials for roofing in London. On true principles it should be lead, but the cost is in the way. No doubt zinc is the nearest imitation (!), but it is a poor one. Nor do I know of my own knowledge that it is durable in London. People always throw a doubt about it. Even at Hamburg I found the same misgiving, though I, nevertheless, used it for cresting and other ornamental purposes. I there used slate laid in the German manner for the roofs, but then it is the old covering of the country. At St. Etheldreda's tile would have been heavy if the tie beams were still omitted; but their restoration removes the objection. Perhaps the safer course is to fall back upon tile. Westmoreland slate is, of course, an excellent material, but not one in ancient use in London."

I, accordingly, used tile, and the roof is considered a success.

Mr. Luke Limner instances the effect of the green colour used in roofs of buildings in Russia and the trans-Danubian provinces, where copper cannot be afforded, and pleads for the adoption of copper as "a costly material which proclaims its individuality at once as a noble cover for a noble structure."

Mr. W. E. Martin, of Hereford, writes:—

My own experience leads me to think that Mr. Seddon's decision in favour of slate was a wise one. The colouring of the slate roof of Llandaff Cathedral is very beautiful, while that of our Cathedral Lady Chapel roof, covered with lead, is detestable, from the fact that lead in such situations becomes after a while roughened on the surface, the inequalities holding "blacks" and other impurities deposited from the atmosphere. I would go further than Mr. Seddon, and adopt stone slabs for the coverings of our ancient churches. Many were so covered in the middle ages, and some still remain with their stone slab coverings intact. Modern restorers seem to think stone roofing slabs very suitable for concrete, and many a glorious old stone roof in this country has been shorn of its beauty to make way for that artistic piece of pottery—the Broseley tile! "Stone tiles" are objected to because of their great weight as compared with lead, slates, or tiles. At first sight the objection seems plausible, as a "square" (100ft. superficial) of roof covered with lead weighs 840lb., slates about the same, plain clay tiles in mortar 1,540lb., and stone tiles 3,180lb.; but this apparently great weight is easily carried by a roof having rafters not more than 4in. by 3in., and spaced 15in. apart—a construction considerably lighter than that of any church roof I am acquainted with. Lichens and mosses attach themselves readily to and grow luxuriantly on stone roofs, and at this season especially the colouring of this vegetable matter and the strong shadow lines of the slabs, varying in thickness from ¾in. to 1¼in. combine to produce an exquisite effect unattainable by the use of any other material.

The Hove Town Commissioners recently advertised for and received two tenders for the erection of a groyne, near Medina-terrace; the amounts exceeded the amount estimated, and the commissioners therefore decided to carry out the work themselves under the supervision of Mr. E. B. Ellice-Clark, C.E., their surveyor. At the same meeting the commissioners agreed to allow Mr. Ellice-Clark to undertake private work.

Building Intelligence.

Burton Leonard.—On Wednesday, Nov. 20, a new church at Burton Leonard, Yorks, was consecrated. Mr. C. H. Fowler, of Durham, is the architect. The new edifice is in the Late Decorated style, and consists of a chancel, nave, and organ chamber, a vestry on the north side of the chancel, a porch on the north side of the nave, and a bell gable at the west end. The dimensions of the church, inside measurement, are—nave, 53ft. × 21ft. 6in., and chancel, 28ft. × 18ft. The height of the nave from the floor to the wall plate on each side is 17ft., and from thence upwards to the apex of the roof 13ft., or a total altitude of 30ft. The wall plates of the chancel are each 17ft. high, the roof resting thereon being 11ft. in height to the centre, or a total of 28ft. high. The masonry is limestone. The roofs are covered in with red tiles, and the flooring of the sanctuary is paved with encaustic tiles from the Lugwardine works of Mr. Godwin, Withington, near Hereford. Underneath the flooring is provided a hot-air apparatus by Mr. Grundy, of Tyldesley, near Manchester. The sole contractor is Mr. T. Wood, of Pickering, and the clerk of the works is Mr. Nelson, of Malton. Mr. Milburn, of York, executed the whole of the carved work.

Garway, Herefordshire.—This very interesting church is now undergoing a gradual process of repair and restoration. The first instalment of the works being completed, the Bishop of Hereford attended the opening services on the 8th inst. The greater portion of the building dates from the commencement of the 14th century, though there are not wanting evidences of both Norman and Perpendicular times. The Knights Templars resided at a preceptory close by, so it is inferred that a good deal of the work is due to their skill and energy,. Indeed, internal corroborative evidence exists of this in the position and size of the tower, which is 27ft. square and placed about 10ft. away from the N.W. corner of the nave, as well as in several of the ornamental features of the interior, notably on the richly-sculptured chancel arch. The following may be taken as a sample of the work already done:—A heavy gallery extending across the west end of the nave and along the greater part of the north wall, has been removed, revealing a three-light window. A wall between the chancel and chapel has also been taken down, thus showing to full advantage a beautiful specimen of 14th century arcading. The old oak benches, with ends 4in. in thickness, has been refixed on a wooden platform, and by a simple alteration made comfortable enough for 19th century worship. The old altar slab, with its 5 incised crosses or wounds, which was found face downwards amongst the old paving of the church, has been placed again in its original position. The beautiful carved oak rood loft, for which the district is famous, has long since disappeared, but the flight of steps and raised gangway leading to it, extending along the whole length of the north chancel wall, are fortunately intact, while the original doorway has now been opened out. The work has been executed by Mr. W. Balcomb, of Kenilworth, under the superintendence of Mr. E. H. Lingen Barker.

Holywell.—The memorial stone of a new market hall at Holywell was laid last week. The general plan comprises a front building for a town hall (not yet commenced), containing on the ground floor spacious reading-room, board-room, inspector's office, entrance hall, with communication to the markets, and an archway over the side road; and on the first floor assembly-room with octagon end, recessed platform, and open-timbered roof. This room will be capable of seating 450 persons. The façade will be built with stone in the Gothic style, with traceried windows, and central gable, in which will be a circular panel containing the arms of the town, and a bell turret springing from the junction of the roofs. Behind the building and adjoining it are the markets, now in course of erection, which are being built with brick walls, iron and glass roof, and stone flag floor. The vegetable market has a floor space of 2,925 square feet, and contains 33 stalls; behind this, and approached from it by seven steps, is the butchers' market, which has a floor space of 3,312 square feet, and is fitted with four lock-up shops and 29 open stalls. The work at present in course of erection will entail an outlay of £2,300, and the town hall a further outlay of £2,000. The architects are Messrs. Scrivner and Sons, of Hanley, and the builders Messrs. Thomas Hughes and Son, Holywell.

Lewisham.—The memorial stone of the church of St. George, Perry-hill, Lewisham, Kent, which was commenced some three months ago, was laid on Saturday, November 23rd. The church will hold 600 people, and consists of a nave, 85ft. by 27ft. 6in. wide, with clerestory and aisles on the north and south sides, divided by Mansfield stone pier columns, with carved capitals and moulded arches. It will have a spacious apsidal baptistery at the west end of the nave, with an open vestibule on each side leading to inner and outer porches. The vestibules and bapistery communicate with the nave and aisles by five moulded arches. The chancel, which is 40ft. long and the same width as the nave, is approached therefrom by three steps, with four additional steps to the sacrarium, including the altar piece. It is apsidal on plan, and is to have timber-vaulted roof, supported by marble shafts. The walls will be faced with Kentish rag in horizontal drop courses, the dressings being in Bath stone. The style is English Decorated. The entire cost will amount to £8,000. The architect is Mr. William C. Banks, of Gracechurch-street, London. The contractor is Mr. B. E. Nightingale, of Albert Embankment.

Liverpool.—Extensive additions have been completed to the *Courier* office in this town in connection with the original buildings in Victoria-street. The new portion consists of a well-lighted building of five floors, with lofty basement, and has been arranged for private offices, evening paper offices, and spacious workrooms. The architects were Messrs. F. and G. Holme, of Church-street.

Metropolitan Board of Works.—At this board on Friday £1,900 was ordered to be paid to the vestry of Kensington, being a moiety of cost of the formation of a new road from Church-street to Vicarage-gardens, Kensington, and £150 to the Whitechapel District Board, being one-half cost of improvement in Old Castle-street, Whitechapel. A sharp discussion arose as to the charges made by the consulting chemists employed by the Parliamentary Committee in December last in connection with the water supply bills of last session. It was stated that these amounted to no less than £1,901 14s. for analyses. Eventually the matter was referred to the works committee for consideration. A plan prepared by the board's engineer for a 25ft. roadway leading into Carting-lane, Savoy, was approved. A long report was presented by the works committee on the protection of the City from fire. It stated that in August last 40,000ft. of hose was ordered for use in connection with the hydrants now being established in the City; that this hose is being supplied concurrently with the completion of the hydrant system. The committee considered that the City had in no way suffered from the removal of fire-brigade headquarters from Watling-street to the larger premises in Southwark-bridge-road, but recommended that, as a concession to the views of the fire insurance offices, a steam-engine be temporarily placed at Watling-street until permanent arrangements be determined upon, and further that the fire-brigade committee be instructed to endeavour to obtain a site in the neighbourhood of Farringdon-road or Ludgate-circus for a station to replace that which formerly existed in Farringdon-street. Mr. Dresser Rogers, in moving the adoption of the report, pointed out the difficulty of making expensive changes in brigade arrangements owing to the special rate being limited to ½d. in the £, and urged that if the measures now proposed were taken the City would be more effectively protected than at any previous time. The report was adopted, and copies ordered to be sent to the Home Secretary, the water committee of the City council, the insurance offices, and others who had addressed the board on the subject.

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TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.]

All letters should be addressed to the EDITOR, 31, TAVISTOCK-STREET, COVENT-GARDEN, W.C.

To Our Readers.—We shall feel obliged to any of our readers who will favour us with brief notes of works contemplated or in progress in the provinces.

Cheques and Post-office Orders to be made payable to J. Passmore Edwards.

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S. S. (We do not remember the query; repeat it.)—G. R. (We think you would; we are sure you ought.)—Joiner. (Write B. T. Batsford, 52, High Holborn.)

"BUILDING NEWS" DESIGNING CLUB.

Omega. (Kitchen, offices, and cellars are to be on ground floor.)—Robert Phillips (objects to plan of "Sunflower," published last week, and observes there is nothing shown to carry the chimney of bedroom over dining-room. If he looks again he will see it is intended to be corbelled out from the one below, as in thousands of executed buildings. We quite agree with the remark that it is a grave fault with followers of the new style to draw large square shafts resting on angle chimney breasts.) Cleo. (Your suggestion would be impracticable and cause constant trouble. Imagine transmitting 60 designs to all the designers in turn!)

Received.—Edwin Wright.—D. in Triangle.—J. E. Cruickshank.—T. C. Cummington, Confido.

Drawings Received.—Triangle in Circle.—S in Circle.—Mechlin.—Yestam.—Anglesea.—St. Lucy, motto "J. R." in Circle.—Omega.—Kingston.—Omnia Vincit Labor.—Frappe Fort (1).—Frappe Fort (2).—J. S.—Spero Meliora.—Enigma.—Contilo Brutus.—Cyprus.—Cleo.—Semper Spiro Spero.—Curlew.—Thor.—Amphion.—Ogmore.—Try.—North West.—Such a Dog.—Design.—Jack M. with Leaves.—D. in Triangle.—Prenez Garde.—Con Amore (your drawings are in two half sheets instead of one whole sheet).—Semper Fidelis.—C. in Triangles.—East Anglian.—Peter.—Advance.—Nil Desperandum.—B. M. W.—Cabul.—Montague.—Signum.—Tam O'Shanter.—Ogmore.—Amphion.—Chimney Pot.—Through in Circle.—Ich Dien.—Maltese Cross.—Try in Square.—Thor.—Iota.

OUR COMMONPLACE COLUMN.

Received.—C. P. E.—G. H.

Correspondence.

BRITISH AND AMERICAN ANONYMOUS CRITICISM.

To the Editor of the Building News.

Sir,—In your issue of Nov. 15, 1878, you published an extract from the *American Architect and Building News*. The extract contained a critique on my own house, and also on the studio lately built by Mr. E. W. Godwin for Mr. Whistler.

I should not have made any remarks upon the subject (although as regards my own house there are several minor inaccuracies), but for

a leading and anonymous article (of which the authorship can hardly be doubtful) in your contemporary (the *British Architect*), where with equally questionable taste and disregard of probability it is asserted:—

1. That I have doubtless entertained "the American critic, who on the other hand has been unfortunately overlooked and possibly snubbed by Mr. Godwin and Mr. Whistler."

2. "That the critique can only be explained by some personal motive, unless indeed the article was more or less inspired by Mr. Burges."

The article concludes with a somewhat angry refutation of the correspondent's critique upon the house of Mr. Whistler, and the alleged faults of that "distinguished painter's architect."

As other subjects are mentioned than those contained in your extract—*e.g.*, Messrs. Gillow's houses on the Embankment—one's curiosity is naturally aroused, and I now write with the view of asking you to be so kind, if possible, as to print the whole of the article from the *American Architect*.*

Perhaps Mr. Godwin might supply you with a plan of Mr. Whistler's house, to say nothing of an elevation, so that we might all convince ourselves how far the American critic is at fault, and the extent and truth of those "wild, incorrect—not to say vicious—statements," "which"—as the writer in the *British Architect* says—"would be damaging if Mr. Godwin's reputation was not as much beyond the reach of the *American Architect and Building News* as Mr. Whistler's painting is beyond the comprehension of this smart critic."

For myself I can only say at the present time I am totally ignorant of the name of the American critic, and that consequently the charges of entertaining him and inspiring the article must fall to the ground.

I may also add that I have a very strong opinion of the conduct of any one who makes personal charges, and who declines to sign his name to them.—I am, &c., W. Burges.

15, Buckingham-street, Nov, 25, 1878.

IRON ROOF CONSTRUCTION.

Sir,—I noticed in your issue dated the 22nd inst. a report of a paper having been read by a Mr. T. Gillott, of the Farnley Iron Works, on "Iron Roof Construction." He states, when describing what he terms examples of the fourth order, that the roof over the Rhiju Spoorwag station at Amsterdam was formed of a cast-iron tube arch, 8ft. in diameter and 30ft. rise, the span being 120ft. As the erector of the said roof, perhaps you will allow me to state for that gentleman's information that his dimensions are nowhere near correct, his first being most absurd.

What a pity it is that people, as a rule, do not take the trouble to make themselves perfectly acquainted with a subject before writing upon it!—I am, &c., E. Price.

20, St. John's-grove, Croydon,
Nov. 25th, 1878.

COMPETITIONS AND THE ADDRESS OF THE PRESIDENT OF THE INSTITUTE.

Sir,—Your critique on that part of the president's address relating to competition will, I feel sure, receive the approbation which it so justly deserves. It is all very well for those members of the profession who are established on their lofty perches to look down on their younger brethren, and tell them that "quiet labour" succeeds better than trying "to run before they can walk." If committees are to select from names instead of from drawings, it simply means that well-known and established architects will get all the work, and young men, no matter how clever they may be, will go to the wall. We are asked to think that nothing is gained by competition; still, how can we shut our eyes to the fact that the Manchester Assize Courts and Town Hall, also the Midland Hotel, Albert Memorial, and Hamburg Church, were won in this way, and he must be a bold man indeed who will deny that the architects of these buildings have gained nothing by competition. The architect of the Criterion Restaurant has more than a little, I fancy, to be thankful for under this head; so that competitions, if properly conducted, are not such very terrible things. Our president closed his address by asking whether the action of the Institute was to be "active or passive." I trust it will be the former, and that this most vital question of competition will not be burked, but will receive the attention which is its due; and I say it is the solemn duty of the Institute to take the matter up and endeavour to get a law passed which shall prevent its members from gambling away their very life-blood.—I am, &c. W. Galsworthy Davie.

* This we have done. See p. 572.

THE SO-CALLED TWELFTH CENTURY WINDOW AT LINCOLN.

Sir,—I send you photo of the window as discovered. Groining is a misnomer. The basement is arched over nearly semicircular plastered (no ribs), but whether stone or brick I

cannot say, as I did not examine it. The date, 1107, is distinctly seen, being cut on the stone head of doorway leading from one compartment to the other.—I am, &c., Geo. Bacon.

10, Norman-street, Lincoln, Nov. 26.

Sir,—I have had my attention called to the paragraph copied in the Building News, on p. 518, from a local paper, with reference to the recent uncovering of a Transitional Norman window in the house of Aaron the Jew in this city, and the professed discovery of the date, 1107. I need hardly say that I am in no way responsible for this paragraph, which I find, to my annoyance, has been copied into other journals—thus, apparently, connecting my name with a gross archæological blunder. I need not say that the date 1107, in Arabic numerals, bears the proof of its forgery on its face. The earliest date on any building in England, in Arabic numerals, known to me, is that within the tower of Heathfield Church, Sussex, 1445. There is another, three years later, 1448, on the lychgate of Bray Church, Berks. At the Episcopal manor-house at Bishop's Waltham, Hants, occur the arms of Langton, Bishop of Winchester, 1493; and on a pane of glass in the passage leading from the hall to the kitchen at St. Cross, we have the motto of Robert Sherborne, master of the hospital, afterwards Bishop of St. David's, with the date 1497. A date in Arabic numerals, still earlier than those already cited, 1427, is said to exist on the lintel of a door at the Talbot Inn, Sankey-street, Warrington, but I have never seen it. Any such date, therefore, as that quoted from Lincoln, wherever found, may be safely regarded as a forgery. That this is a deliberate attempt to hoax a credulous public there can, I fear, be little doubt. Some months since the Bishop of Nottingham and myself visited the cellar of Aaron the Jew's house to inspect a date of which we had heard from the occupier. It was on the outer face of the lintel, and proved, as I expected, to be of the 16th century (I forget the exact year), the 5 being carelessly formed as a wavy stroke, not unlike a badly-made figure of "one." To-day I went to examine it again, and to my disgust I find that this date had been erased (not so completely, however, but that the traces of the figures were visible), and on the lower surface of the horizontal lintel, a position at once sufficient to discredit it, the date 1107 had been cut in clear figures. I need not enlarge on the discreditable character of such attempts to gull the unlearned, which simply prove the ignorance and want of principle of those who perpetrate it. If, as is presumable, the date is intended to fix the age of the house, it is unfortunately more than half a century too early. Aaron the Jew, to whom the house is traditionally assigned, was a celebrated banker and money-lender in the reign of Henry II., whose death is placed in 1187. The window recently brought to light by the removal of some brickwork is an almost exact counterpart of that in the well-known "Jew's House" a little lower down the hill, and belongs to the latter half of the 12th century. The whole house is so interesting, and so well merits attention, that I the more regret the discredit thrown upon its authenticity by this ridiculous forgery.—I am, &c.,

Edmund Venables.

The Precentory, Lincoln, Nov. 26, 1878.

CREWKERNE GRAMMAR SCHOOL COMPETITION.

Sir,—Since writing to you a fortnight ago upon the above subject *amended instructions* have been issued. Although some of the outrageous clauses have been slightly modified, the conditions are now such as obviously cannot be complied with. Both accommodation and expenditure have been cut down, £6,000 being now the total sum which is to cover everything, even extras and *contingencies*. I should strongly advise intending competitors to have a clear understanding as to what is meant by the last term, but at the same time I think they would be doing far better by declining it altogether. As long as architects will lend themselves to entering into speculations in the way of competitions which in many cases result in nothing more nor less than swindles so long will the public furnish them with baits similar to the one at present under consideration. In my opinion no architect who has the slightest respect or regard for his profession ought to enter into any competition unless—firstly, the conditions and instructions be drawn up with the aid of a well-known professional man; and, secondly, the premiums be awarded by the said gentleman, whose decision shall be final.—I am, &c.,

One who will not Compete.

Sir,—I have received the amended particulars of the competition for the Crewkerne Grammar School, which differ but little from those recently issued and referred to in your columns. The following are some of the "amended" conditions:—

"After full consideration of the plans, &c., the governors will decide whether they approve of one sufficiently to adopt it. Should they do so, they will award the first premium of £50 to it, and £15 to that which, in their estimation, is the next best; but they do not pledge themselves to approve of any of the plans. In case of non-approval, no premium will be paid.

"The plans for which premiums shall be awarded will become the property of the governors, together with all details, drawings, explanations, estimates, &c., accompanying them. The other plans will be returned to the addresses given.

"The successful competitor will have to carry out his plan and supervise the erection of the buildings, and he will be required to supply all necessary specifications, working drawings, and details, make out and examine the necessary accounts, and do all things usually done by architects *without any extra charge*, beyond a commission of 5 per cent. on the sum of £6,000.

"In this case the premium of £50 will not be paid, but will be considered as covered by the commission."

Why offer a premium of £50 if it is to be merged in the commission of the successful competitor?

The conditions terminate with these clauses: "Competitors must distinguish their plans, &c., by mottoes only, and must furnish their correct names in a sealed envelope bearing the corresponding motto on the outside.

"The address to which any *unsuccessful* plan is to be returned may also be written outside the envelope enclosing the same."

It is scarcely probable that an architect competing would assume that he will be *unsuccessful* before sending in his plans, and placing the address outside the envelope enclosing the *motto* would at once disclose the author of the design, and entirely defeat the object in view.—I am, &c.,

ONE WHO WILL NOT WRITE HIS ADDRESS ON THE ENVELOPE CONTAINING THE MOTTO.

ART LECTURES AND DISCUSSIONS.

SIR,—Your correspondent "Bookworm" suggests that the Architectural Association should start an essay class. One already exists for the scientific part of the profession—viz., the Architectural Science Class. It is proposed to have papers read at the meetings of the class of design on art questions, planning, &c., and we shall be glad if "Bookworm" will favour us with one this session.—I am, &c.,

W. J. H. LEVERTON.

Architectural Association, 9, Conduit-st., W., Nov. 28, 1878.

A new Roman Catholic mission chapel of St. Joseph, situated at Moore-street, New Normanton, Derby, was opened on Tuesday. The treatment is simple Gothic, the materials being red bricks, with blue brick strings and dressings of Bath stone. The roof is partly open-timbered, covered with red and blue Staffordshire tiles in alternate bands, and finished with tile crestings. The internal dimensions of nave are 35ft. by 18ft., and both this and chancel will be utilised during the week as schoolrooms. The building is the commencement of a block to comprise church, schools, and presbytery. The contract has been carried out by Mr. T. Bakewell, of Derby, from the designs of Messrs. Sheffield and Hill, of St James's-chambers, Derby.

A very fine carved slab of late Roman work has, within the last few days, been discovered during some excavations at Carlisle. It is 4ft. in height, by about 3ft. broad. The design represents a group under an alcove, on the top of which are two lions, each mounting a human head, symbolising the power of the sun over men. The same subject appears on other sculptures previously found in the vicinity of Carlisle. There is also between the lions a mutilated winged figure, holding a third head. Below there is another group—that of a mother and child; the latter plays with a bird on his mother's lap; her left hand rests on the lad's shoulder, while her right holds a circular fan of a type seen in many of Alma Tadema's classical pictures—startlingly like a pattern now in vogue. We understand that Mr. R. S. Ferguson will read a paper on the discovery before the Society of Antiquaries at Burlington House.

The Pavilion at Brighton is being redecorated for the Town Council by M. Bouvard, formerly foreman to M. Tony Dury, by whom the work was originally executed.

Plans prepared by Mr. Malcolm, architect to the Burial Board of Sunnydale, near Wakefield, for a cemetery chapel, have been approved by that board.

At the Wandsworth District Board of Works, on Wednesday week, the clerk reported the result of the recent proceedings against Messrs. Wallace, of the Chemical Works, Battersea, for pouring noxious chemicals into the public sewers—viz., that a fine of £3,000 had been imposed upon Messrs. Wallace, but that fine was not to be enforced if they paid the whole of the costs, including those of the trial at Croydon, and if they wholly discontinued, directly or indirectly, the nuisance on their premises.

Mr. Henry H. Ingram, late surveyor and inspector of nuisances to the St. Alban's Town Council, has just been appointed in similar capacities by the urban sanitary authority of Maidenhead, at a salary of £120 per annum.

The parish church of Broughton Giffard was reopened on Wednesday week by the Bishop of Salisbury, after restoration from the designs of Mr. Scott. Mr. R. Mullings, of Devizes, was the contractor.

New banking premises are about to be built at Halifax for the Halifax Commercial Banking Company, from the designs of Messrs. W. and R. Mawson, of Bradford.

Pateley Bridge Independent Chapel is being restored from plans prepared with this view by Mr. S. Robinson, architect, of Bradford. The cost will be £1,100.

Intercommunication.

QUESTIONS.

[5595.]—**Furniture**.—Are the plain black chairs with rush bottoms made in this country or abroad? They are very cheap and good, but the prices at which they are sold vary so much that I want to find out where they are *made*. Exactly the same articles—all good alike—are sold by a well known Oxford-street firm, by an advertiser in your columns, and by others at widely different prices. The articles are so good that I am sure, if advertised in your columns, and those of similar journals by the *makers*, they would find a large sale.—KAPPA.

[5596.]—**Polishing Oak Floor**.—Would some of your correspondents kindly inform me the best mode of polishing an oak floor? I have tried several methods, but all have proved unsatisfactory.—A SEVENTEEN YEARS SUBSCRIBER, Ontario.

[5597.]—**Thickness of Zinc**.—Will "A. L." Glasgow, say on what basis his data is compiled for thickness of zinc, as a stamped sheet of No. 16 Vieille Montagne zinc I gauged a short time ago gave only ·038in. as an average thickness. Is there no reliable data to be depended on from any source as to this?—ZINC.

[5598.]—**Party Wall**.—The respective premises of A and B have only a wooden separation. A wishes to rebuild, and to take his share of a proper party wall, built centrically on the boundary of the two properties. B will not concur. If A may rebuild, and leave the party structure as at present, B may do the same at a future time; and thus the wooden separation of the buildings might be perpetuated. Were it burnt down the erection of a brick wall would of course be insisted upon, but I am anxious to learn whether that is the only condition that would make it obligatory, seeing that party walls are intended to prevent fires.—MUTUAL ADVISER.

[5599.]—**Sand in Plaster**.—Is it safe in plastering a house internally, near the sea-shore, to use sand which has been washed down to the mouth of a river? The sand is essentially river sand—coarse, sharp, and good, but is covered by salt water at every tide. Similar sand has been used for mortar in the walls, which are well-built hard stone, 18in. thick, and battened. My client has been told that unless bank sand be used internally the walls will always "sweat," and refuse papering, and that the battening, &c., will be prematurely rotted. My own experience of houses similarly built does not lead to such a result—the house I live in, built now some 15 years, having always been perfectly dry. The nearest sand-pit which could be used is several miles away. I would be obliged if some one with experience in sea-side building would kindly give some information on above question.—ARCHITECT.

[5600.]—**Arches and Abutments**.—I should be obliged if some of your readers will kindly give me an example of the rules worked out as named in Molesworth's "Pocket-book of Engineering Formulæ," for 1865, page 228; and Hurst's "Architectural Hand-book," 1865, page 65, as I do not understand the way to put them in plain figures from these formulæ.—P. L.

[5601.]—**Terra Cotta**.—Terra cotta is constructed in hollow blocks. Would any reader favour me with the best mode of filling up the same, so as to make each block equally able to sustain a crushing weight, as solid walling, either brick or stone? How are the blocks in the Natural History Museum filled up?—T. B.

[5602.]—**Half-Timbered Gable**.—I am about building a half-timbered gable, and wish the plaster between the timbers to be pure white. What are the best materials to use for the purpose, and what is the best method of obtaining a good white for external use?—O. P. J.

[5603.]—**Corn Exchange**.—I should feel obliged if any correspondent would inform me whether any large corn exchanges are lighted exclusively from the roof, or from the roof mainly, aided by side lights right and left, not more in height than from 6ft. to 10ft. from the roof plate downwards? Examples of roof-lighted exchanges within, say, 120 miles of London, would add to the value of the information sought, as I am desirous of inspecting examples before designs are finally prepared and submitted.—PETER PENCIL.

REPLIES.

[5575.]—**Solid Contents of Hollow Columns**.—On page 546 I see an answer to query 5575, which is grossly inaccurate. The answer is signed "A. H. S." The first blunder made is in assuming that the circumference of circle is 3 times the diameter; a line or two below we find this extraordinary announcement—"square of 24 = 6!" The correct way of solving the question is, of course, that pointed out by your correspondents, "J. L.," "G. H. G.," and "Jas.," in last week's number. In the solution given by "J. L." on page 519, it is stated "the area = diameter × ·7854;" it should have been diameter *squared*. This, I apprehend, is a mistake in setting up, as the question is worked correctly.—C. E.

[5583.]—**Gothic Roof**.—Here is a young architect—no doubt a fine young English architect, one of the modern time—blest (or otherwise, as he most likely considers) with many books, asking for more—simply that for the reason that those he possesses yield their contents only to such as steadily peruse them. One author may have patiently measured and drawn the finest examples, another have represented them in general form and decorative completeness, while yet another elucidates the principles upon which they were designed. But no! the fine young English architect must have old English roofs picked to pieces, and their timbers ticketed in tabulated form. Unfortunately for him those roofs were designed artistically, and by very different processes to the mechanical framings of which every constituent may be found in Tredgold. Devoutly is it to be wished that those alone be trusted to design Gothic roofs who are qualified by previous study, and capable of thinking as they work.—TOM WINDBRACE.

[5592.]—**Ventilation**.—In reply to "Hugh's" inquiries, it is impossible to state exactly the amount of air required for each person, as it varies according to the circumstances under which we are placed, the same person requiring at one time 2 or 3 times as much as at another. Writers on the subject give different quantities. Pictet concludes that a man requires 5 cubic feet of air per minute; Reid, 10; Arnott, 20; and Roscoe, 20 cubic feet. There is no doubt the more you can obtain with comfort the better. Gas and fire would also require more air in proportion to the amount of consumption. I have found in experimenting that a room can be best ventilated, and with the greatest economy, when the air is admitted at the bottom, and the vitiated carried away at the top; whereas, when the fresh air is admitted at the top, it becomes mixed with the vitiated, and a much larger quantity is required. I have effectually overcome the difficulty of draught by admitting the air through cone-shaped openings, which causes it to be quickly radiated and diffused. I am now having bricks made with conical perforations, which I think will be found to be the most simple and inexpensive method yet known for obviating this difficulty.—J. E. ELLISON, Leeds.

[5592.]—**Ventilation**.—The average cubic quantity of air breathed by each person per hour is about 14 cubic feet; but as each person throws out from the lungs a large proportion of carbonic acid, it is necessary to mix 1 part of this vitiated air with 125 parts of pure air. Therefore, each person requires about 125 times that quantity, or 1,750 cubic feet per hour; or, better, 2,000 cubic feet. A room 12 × 12 × 100 = 1,440 cubic feet, would require 300 to 500 cubic feet of air extra per hour for each person. An ordinary gas-burner consumes nearly 45 cubic feet of air per hour, or vitiates the atmosphere of a room nearly as much as three persons. A fire in the room, if the door is left open, assists the ventilation of the room. For sleeping, each person requires 500 cubic feet of space, and 50 square inches of apertures to allow foul air to escape, and fresh air to come in.—J. L.

[5593.]—**Perspective**.—In interiors it is quite usual and convenient to extend the lines of the floor and ceiling, or, if needed, the sides beyond the fixed plane of projection. In exteriors such a course may to some extent be followed. But, with closer reference to "Provincial's" question, it may be positively said that buildings and geometrical plots alone are protected by plan. The sky and landscape surroundings, though introduced with due subjection to perspective laws, are of too accidental a nature to require very precise representation. They are consequently treated *ad libitum*, and in extent suited to the intended size of the view rather than to fact. One consequence of this freedom is that far more than a strictly legitimate space is commonly allotted to the approaches and foreground. Fanciful inequalities of level have to be conjectured or indicated, in order to account for a superficies of paper that would serve for miles, one might almost say, of level ground.—HEIGHT-LINE.

[5593.]—**Perspective**.—"Provincial" is not at all clear in his question. If he has had any experience in perspective drawing one would think he could scarcely need put the query. It does not require that the ground plan from which the points are taken should be of any specified size (or scale). By merely pushing the plane of picture backwards or forwards the vertical lines of the building will be increased or diminished to any extent, or may be enlarged or the reverse by means of the proportional compasses.—B.

[5594.]—**Foundations**.—In reply to "Student" the chief and safest rule is to carry the wall down to a solid bed, for although the weight of wall may not demand such a foundation there is always a probability of the building being raised. "Student" may ascertain the weight of his wall and the pressure per square foot on the foundation, and then test by a trial hole or a crowbar the soil on which he is about to build. If it resists the bar in every part he may safely build upon it, if not the best way is to excavate all the loose soil and doubtful strata, and bring up with concrete. The only rule in such cases is experiment. The soils that can best be depended on are gravel, a strong earthy sand, and sandy clays of a nature that will not expand or contract from changes of weather. The question, after all, is not one of proportion, but one of safety and soil, though it is unnecessary to place footings much below the lowest floor, as concrete is better as a filling-up material.—G. H. G.

Our Office Table.

At a meeting of the Gloucestershire branch of the British Medical Association held at Gloucester on Tuesday week, Mr. F. W. Waller read a valuable paper "On the desirability of combined action between the medical and architectural professions, with a view to the advancement of sanitary knowledge." The object of the paper was to urge the importance of combined action between the medical and architectural professions for promoting a system of building by which health may be best maintained and sickness alleviated. Mr. Waller appealed to the medical profession to correct popular errors in the matter. While careful to retain all that is beautiful and valuable in old examples, why, he asked, should we copy details wholly unfitted to present wants—notably, entire absence of ventilation, extravagant waste of heat, imperfect drainage and water systems, and many other existing defects which might be avoided? Mr. Waller also threw out some useful hints as to drainage.

At a meeting last week of the Edinburgh and Leith Engineers' Society, a paper was read by Mr. Robt. H. Smith, formerly Professor of Engineering in the Imperial University of Tokio, Japan, on "The Calculation of the Strains and Stresses in Redundant Structures." He described a redundant structure as one in which the number of links was greater than the number of flexible joints, which was just sufficient to render the structure stiff. He explained that this latter number was always three less than twice the number of flexible joints. He pointed out that what was usually called a non-redundant structure became redundant when laid upon and fixed to its abutments, and that it was on this account that the horizontal components of the redundant reactions were usually said to be indeterminate. Mr. Smith then described in detail the graphic and other methods of calculating these horizontal components from the *moduli* of elasticity of the different members and of the abutments, treating separately link-work structures and massive arches, neither of which, he believed, had hitherto been completely investigated. After explaining the application of the general method in structures of any degree of redundancy, he concluded with some remarks upon the impossibility of profitably avoiding all redundancy in engineering structures.

Mr. John Davis, of 201, Old Kent-road, has sent us the advance sheets of a new venture, to be launched in January next, which ought to command the support of English architects and art students. It is an English reproduction of "L'Emulation," the monthly publication of the Central Architectural Society of Belgium. Each issue will consist of four large folio plates, illustrating modern Flemish examples, executed in photo-lithography, together with a literary summary of Continental doings, and subjects of current interest. Some of the illustrations ready have been submitted to us, and our opinion of them is very favourable. The first number, which will be ready on New Year's Day, will contain seven plates of the Paris Exhibition Prize Buildings of Belgium. Mr. John Davis has been appointed the sole agent in England for the work, and all subscriptions and communications should be forwarded to him.

Stimulated probably by the reports of trials of various electric lighting arrangements, the Phœnix Gas Company last week wrote to the Lambeth vestry, offering to test some "improved burners" for street lighting, at the intersection of York-road and Stamford-street with Waterloo-road, and to add to the number of lights in the latter thoroughfare from the bridge to the S. W. railway station, and rearrange the lamps so as to make the distances apart uniform, and secure thoroughly efficient lighting of the road throughout the specified distance. As these improvements, including the extra gas to be consumed, are offered free of cost to the ratepayers beyond the present gas rate, it is almost needless to add that the vestry gave the required sanction at once. The alterations are to be put in hand immediately.

The latest attempt of the managers of the Royal Albert Hall to retrieve some of their previous disasters, and to obtain ready money to discharge their pressing liabilities, does not promise success. Their idea is to open in January next a great Fine Art Exhibition, to support which appeals have been scattered far and wide. The show will consist for the most part of works which have failed to get hung elsewhere. In addition to painters in oil and water-colours, invitations have been issued to all sculptors and modellers, engravers, and photographers, to furnish specimens of their work, and in order to give additional attraction to the invitations, it is announced that only 7½ per cent. commission will be levied upon all exhibited works which are sold within the hall.

The death is announced of Mr. Robert Wallis, landscape engraver. He was born in London on the 7th November, 1794, but spent the earlier years of his life in the country, returning to London about the year 1818, when he soon took a high position in the art world. Many of the best specimens of his talent will be found in Turner's "Southern Coast," "England and Wales," Rogers' "Poems," and in the expensively illustrated "Keepsakes," and other gift books of the period. Among his larger works reference may be made to "Lake Nemi," after Turner, an artist's proof of which realised 90 guineas under the hammer at Christie's about three years ago, and "The Approach to Venice," also after Turner. This was his last work of any importance, and it is, perhaps, the most successful rendering of a picture by the great master that has appeared since his death. It was exhibited at the Royal Academy in 1859. Shortly after this Mr. Wallis relinquished all professional engagements in consequence of advancing age, and retired to Brighton, where he died on the 23rd inst., aged 84.

The Town Council of Bath considered on Monday a bill for £500 for professional charges connected with the old bridge, presented by Mr. C. E. Davis, the city architect, and which it appeared some members thought too high. Mr. Wilton proposed that the question of payment should be adjourned until the town clerk had made himself acquainted with the law as laid down in the case of Hunt *v.* the Wimbledon Local Board; but Aldermen Gibbs and Murch, and other councillors, protested against the unfairness of throwing Mr. Davis over on a technical point when the work had been actually done, and all understood it would be paid for by the city. Eventually, Mr. Wilton having explained that the object of his proposition was not to avoid payment for services rendered, but to define the legal liabilities of the corporation, the motion was carried, with an addendum referring the claim to a committee, who are to bring up a special report with reference to it.

The fiftieth election of pensioners on the funds of the Builders' Benevolent Institution took place yesterday (Thursday), at Willis's Rooms, St. James's, Mr. George Dines in the chair. There were vacancies for two men and two women, and there were three candidates of each sex. The poll was closed at three o'clock, and shortly afterwards the scrutineers (Messrs. Thomas Stirling and F. W. Keeble) reported the result of the voting to be as follows:—G. E. Mercer, 2,388; Charles Buck, 1,700; Gregory Bartlett, 1,536; Sarah Few, 4,400; Eleanor Weston, 1,100; and Susan Gulson, 600. The chairman accordingly declared the successful candidates to be G. E. Mercer, C. Buck, S. Few, and E. Weston. Votes of thanks to the chairman, scrutineers, &c., brought the proceedings to a close.

The 28th exhibition by the Holmesdale Fine Art Club was held at Reigate Public Hall on Thursday and Friday. There was a numerous collection of paintings, drawings, and sketches by living and deceased artists, including Messrs. Frank Hall, A.R.A.; Q. Orchardson, A.R.A.; S. Cotman, David Cox, M'Whirter, Webster, R.A., W. Linnell, and others. In connection with the exhibition was a display of drawings and sketches sent in in competition for prizes, offered by the club, for seven classes of work. The conditions of competition were that the works sent in must have been executed during the present year, must be original (with the exception of drawings from the flat), the size in no case to exceed 20in. by 16in. The following were the awards:—Class 1, best picture or drawing in oil or water colour, being a figure subject, £3 3s., Miss Steele ("Swan-upping on the Thames."). Class 2, best picture or drawing in oil or water colour, being landscape or marine subject, £3 3s., James Peat; 2nd, £2 2s., H. S. Percy; commended, Miss A. D. Percy and R. C. Baxter. Class 3, best picture or drawing in oil and water colour, any subject not included in preceding classes, £3 3s., James Peat; 2nd, £2 2s., Mrs. Christie. Class 4, best study of trees in oil or water colour, £2 2s.,

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H. S. Percy. Class 5, best work in modelling or carving, £2 2s., H. C. Christie. Class 6, best drawing from the model or round, monotint, any medium, £2 2s., not awarded: 2nd, £1 1s., G. S. Pawle; commended, A. D. Percy. Class 7, best drawing from the flat or copy (for students under 16), £1 1s., Yeoman; 2nd, 10s. 6d., Donaldson.

The electric light on Jablochkoff's system was tried on Monday night at Billingsgate, and the result was "somewhat disappointing." Altogether 16 lamps were employed, but only nine of these were in the main area of the buildings, and the light supplied by them was in the almost unanimous opinion of the salesmen insufficient for their purpose, it being impossible to get a good view of the fish when exposed in the usual way and surrounded by a group of buyers. It is evident that more lamps must be employed if the electric light is to be used, and the cost will then, in all probability, far exceed that of gas. Mr. W. Haywood has given permission to Messrs. Berger, Spence, and Co., to light up the space in front of the Mansion House with lamps on the Werdermann system, a much more promising experiment than the lighting of Billingsgate by the Jablochkoff "candle."

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STAINED GLASS.

BOREHAM.—A stained glass window has been placed on the north side of nave of St. Andrew's parish church, Boreham, near Chelmsford, in memory of the late Sir John Tyssen Tyrell, Bart. The window is the work of Messrs. Hughes, of Frith-street, Soho, and consists of three lights, representing Christ bestowing sight on the blind, giving feet to the lame, and restoring health to the sick. This is the tenth stained window placed in the church during the past four years.

EPWORTH.—The east window of Epworth parish church, in the Isle of Axholme, has been filled with stained glass as a memorial of the present rector, the Hon. and Rev. C. Dundas. The window is of four lights, each filled by two subjects—Christ bearing His Cross, the Crucifixion, the Ascension, the Lord's appearance to the two disciples on the way to Emmaus, the Adoration of the Magi (which occupies two lights), and Christ disputing with the doctors in the Temple. It was designed by Mr. James Fowler, of Louth, and was carried out by Mr. W. H. Constable, of Cambridge.

KELSALE.—The east window of Kelsale Church, near Saxmundham, Suffolk, has just been filled with stained glass to the memory of the late incumbent and his wife. The subject is the "Ascension," and occupies the entire five lower lights, with the Agnus Dei, and the emblems of the Evangelists forming the base on richly treated foliage of 15th century character. In the tracery above are cherubim, and seraphim, and angels, and the text, "Lift up your heads, O ye gates." The figure of our ascending Lord forms the central feature, with the Apostles adoring in wonder beneath. The window has been executed by Messrs. Camm Brothers, of Birmingham, and erected by Mr. T. Gunn, of Stowmarket.

CHIPS.

Lieut.-Col. Ponsonby Cox held a Local Government Board inquiry at Todmorden, on Wednesday week, respecting an application from the Todmorden Local Board for sanction to borrow £4,500 for the erection of a market-house and slaughter-house. There was no opposition made to the proposal.

Mr. H. G. Jones, of Rhyl, has been elected borough surveyor and clerk of works by the Denbigh Town Council.

The Southend on Sea Local Board have rejected plans prepared by Messrs. Thomas and Taylor for draining Porter's town, and have instructed their surveyor to prepare estimates and plans for draining from Sutton-street to York-street, and through Grove-road.

At the meeting of the Oxford Local Board, on Wednesday week, the chairman, Alderman H[illegible], stated that during the year ending Nov. 1st 215 plans for buildings were examined and passed, and that there had been issued 134 orders for connection with the sewers, and 684 orders for the abatement of nuisances, and had taken to 5 new streets and 2 miles of turnpike road. Improvements had been carried out in Corn Market-street, King Edward-street, New Inn Hall-street, Church-street (St. Ebbe's), Queen-street, Gloucester-street, and other thoroughfares. All this work had been carried out without the borrowing of a penny.

A model in clay of the late Archdeacon Sinclair's bust, by his friend, Mr. John Bell, has been placed in position in the parish church of St. Mary Abbott's, Kensington, with a view of deciding whether it shall be executed in marble for the same purpose.

Kirdford parish church, West Sussex, was reopened last week, after restoration, including reseating, removal of west gallery, and erection of new reredos of alabaster and Sussex marble.

On Monday Mr. Frederick Leighton proceeded to Windsor Castle with Mr. F. A. Eaton, the secretary of the Royal Academy. The Queen delivered to Mr. Leighton the gold medal and chain of the office of President of the Royal Academy, and afterwards conferred the honour of knighthood upon him.

At a special meeting of the members of the Eastbourne Local Board held on Monday, it was decided to seek Parliamentary powers to acquire and maintain the foreshore east of the Marine Parade, and to effect other improvements in the town.

The Bishop of Manchester consecrated the new church of St. James, in Canterbury-street, Chorley, on Monday week. The church is in the Early Decorated style, and consists of nave, 60ft. by 32ft. wide; north aisle, 41ft. long by 14ft. in width; chancel, 38ft. long, and a transept. A south aisle is provided for on the plans, but is for the present omitted. Messrs. Ladds and Powell, of London, are the architects; the cost has been £5,200, exclusive of special gifts of pulpit, lectern, and other furniture.

Milbourne St. Andrew Church was reopened last week after restoration from the designs of Mr. G. E. Street, R.A. The former chancel arch, of the Norman Transitional period, has been transferred to the entrance to the Pleydell aisle on the south—a new chancel arch being erected of proportions and character suited to the size of the church. A new aisle of four bays has been erected on the north side of nave. It is lighted by triplet windows. The old Norman font has been replaced by a new one. The western gallery has been removed. New open pews, choir stalls, reredos, font cover, lectern, and altar desk have been added—all worked in oak. The contractors were Messrs. Hales and Son, of Salisbury. The outlay has been about £2,500.

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LEGAL INTELLIGENCE.

INFRINGEMENT OF BUILDING BYE-LAWS.—At Greenwich Police-court, on Thursday, the 21st inst., Amos Cain, builder, of Selby Villas, Broxfield-road, Brockley-road, appeared in answer to a summons. He had been charged by the Lewisham District Board of Works with interfering with a drain belonging to the board in Stanstead-road, and was fined £20 and 2s. costs, and he now attended to show cause why that penalty should not be enforced. Mr. Carline, surveyor to the board, said that defendant had since taken a pipe out, and had not restored the drain to its original condition, although he had partially restored; and he therefore applied for the enforcing of the penalty. Defendant said he had reinstated the ditch, and had made repeated applications to Mr. Carline for his sanction to do what was necessary, but he could not get a reply, or he should have done the work six months ago. In answer to further remarks by the surveyor, defendant expressed his willingness to attend before a committee of the district board at Forest-hill, and the case was therefore adjourned until the 19th of December.

MEETINGS FOR THE ENSUING WEEK.

MONDAY.—Society of Engineers. Paper on "Apparatus for Utilizing Waste Heat of Exhaust Steam," by Jas. Atkinson, 7 p.m.

" Royal Institute of British Architects. Paper on "The Holy Sanctuary at Jerusalem," by Lieut. C. R. Conder, 8 p.m.

WEDNESDAY.—British Archæological Association. Rev. S. M. Mayhew on "Roman Remains Recently Discovered at Lincoln," Rev. Dr. Hooppell on "The Tenth Iter of Antoninus," and Romilly Allen on "Rock Markings at Ilkley," 8 p.m.

FRIDAY.—Architectural Association. Paper by Somers Clark, jun., on "Organs," 7.30 p.m.

Roofing Felts.—F. Braby & Co.

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Trade News.

WAGES MOVEMENT.

BANGOR.—Owing to the excessive dulness of the North Wales slate trade notices were issued last Friday, immediately closing two of the largest slate manufactories at Bangor.

BLACKPOOL.—Wages are being reduced in the building trades of this district by 10 per cent.

CARNARVON.—The men employed at the Carnarvonshire slate quarries have agreed to accept a further reduction of 7 per cent. on their wages.

EDINBURGH.—On Tuesday night a meeting of the Edinburgh operative masons was held in St. Mary-street Hall, for the purpose of considering a "private" circular from the central committee in Aberdeen of the Operative Masons' Society with regard to the Glasgow strike. The chairman read the circular in question, from which it appeared that a proposition had been made by the "lodge" at Helensburgh to the effect that the strike at Glasgow should be continued, and a levy at the rate of 2s. per week imposed for this purpose on all working members of the society; while a proposition had been submitted from the lodges at Aberdeen, Ayr, and Dundee in favour of the immediate close of the struggle, on the ground that, in the present state of the building trade and the position of the society in respect to its "locked-up" funds, it was utterly impossible to carry the strike to a successful issue. After full consideration of the circumstances, 112 voted in favour of the proposition from Aberdeen, Ayr, and Dundee, while only 3 supported that from Helensburgh. The former was accordingly declared carried, and the proceedings terminated.

HASTINGS.—Two meetings of workmen and labourers employed in the building trades have been held at Hastings, at which resolutions were adopted protesting against the proposed general reductions in wages, and a strike was threatened.

LONGRIDGE, NEAR PRESTON.—The men employed at the quarry of Messrs. Cooper and Tullis were on Friday evening informed that they would be paid for the future at the rate of 6½d. per hour, and that the time for working would for the present be restricted to 7½ hours per day, or 41½ hours per week. The drop is from 30s. 5d. to 22s. 6d. per week. Labourers and others have been reduced in proportion, and reductions are also being made by the other quarry masters of the district.

THURSO.—Owing to the depression in trade a large number of men will be discharged to-morrow from the Caithness Paving Company's works and quarries, which form the staple industry in Caithnesshire.

WHITLAND ABBEY GREEN SLATES.

These SLATES are of a grey-green tint, are stout, and made in all sizes. A large stock available for immediate delivery. For further particulars (with a list of important buildings covered) apply to the MANAGER, Clynderwen, R.S.O., Carmarthenshire.—[ADVT.]

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TENDERS.

BETHNAL GREEN.—For alterations to bathrooms at the workhouse for the Bethnal Green Board of Guardians:—

Wire, D. (accepted)	£246

[Six tenders received.]

BRIGHTON.—For the construction of a new timber groyne opposite Lewes-crescent, Kemptown, for the Town Council:—

Harrison, J., of Kingston-by-Sea (acc.) ...	£1,360

[Four tenders received, the highest of which was £1,982 13s. 6d.]

BRIGHTON.—For Soldiers' Home and Mechanics' Institute, Lewes-road, Brighton. Messrs. Holford and Clayton, architects, 152, North-street, Brighton:—

Newnham	£2,897
Bruton	2,592
Patching and Son	2,528
Lockyer	2,490
Garrett Bros.	2,484
Parsons	2,400
Cheesman and Co.	2,390
Botting	2,375
Barnes	2,274

BRIGHTON.—For a new dwelling-house, &c., in Marlborough-place, Brighton. Messrs. Holford and Clayton, architects, Brighton:—

Newnham	£2,205
Cheesman and Co.	2,106
Lockyer	2,106
Barnes	2,042
Patching and Son	1,984
Dean	1,972
Botting	1,889

BRIGHTON.—For alterations and reconstruction of No. 16, Marlborough-place, Brighton. Messrs. Holford and Clayton, architects; no quantities:—

Botting	£570
Patching and Son...	567

LONDON.—For alterations and additions to 64, Grosvenor-street, Grosvenor-square, for Capt. G. F. Talbot. Mr. Robert Keirle, architect:—

Clarke and Mannooch...	£1,027
Eaton	860
Craske	730
Stephens (accepted)	688

CHELMSFORD.—For laying out the new market and approaches for the Local Board of Health. Mr. Charles Pertwee, surveyor:—

Section 1.—Levelling, draining, road-making, &c.:	
Wood, Wm., Chelmsford	£878 0 0
Ford and Norris, Brixton	799 0 0
Walker, J., Chelmsford	655 0 0
Section 2.—Curbing, paving, masons' work, &c.:	
Choat and Son, Chelmsford	1,133 10 0
Hardy, C., Chelmsford	1,117 4 6
Rutty, G. G., Bromley-by-Bow ...	960 0 0
Finnegan, Robt., Northampton ...	900 0 0
Wray, J. H., Springfield	866 0 0
Section 3.—Water mains, iron fencing, smith's work, &c.:	
Green and Burleigh, London ...	2,193 0 0
Cottam and Co., London	1,352 10 0
Beckett Bros., Chelmsford	1,337 0 0
Hill and Smith, Brierley Hill ...	1,183 0 0
Fletcher, George, Wolverhampton...	1,037 10 0
Section 4.—Builder's work in settling house, sheds, &c.:	
Wood, Wm., Chelmsford	587 0 0
Gozzett, H., Woodham Walter ...	541 0 0
Byatt, H., Chelmsford	469 0 0
Choat and Son, Chelmsford	442 0 0

KIDDERMINSTER.—For Kidderminster School of Art. Mr. J. M. Gething, architect:—

Howard and Sons	£3,240 0 0
Baker and Son	2,900 0 0
Thompson	2,835 0 0
Cook	2,698 2 6
Foxall	2,660 0 0
Smith	2,630 0 0
Horton	2,568 0 0
Jones and Co.	2,529 0 0
Binnian and Son	2,496 0 0
Guest (accepted)	2,340 0 0

[Architect's estimate, £2,500.]

KINGSTON-UPON-HULL.—For the erection of shops, warehouses, &c., on the Beverley-road, for Messrs. Cussons Bros. Mr. W. Alfred Gelder, architect; quantities supplied:—

Stanley, A. W.	£2,800 0 0
Hockney and Leggins...	2,700 0 0
Dawes, J.	2,686 0 0
Sergeant, R.	2,639 0 0
Southern, F.	2,524 0 6
Blackburn, F.	2,472 0 0
Beevers, R.	2,450 0 0
Higham, G.	2,443 9 0
Stevens, S.	2,441 0 0
Morrell, J.	2,409 3 0
Coulson, G.	2,334 0 0
Leggott, J.	2,312 0 0
Beilby, F.	2,289 0 0
Raw, W.	2,286 0 0
Jackson, G., and Son (accepted) ...	2,175 0 0

LIVERPOOL.—For alterations to premises, 130, London-road. Mr. J. H. McGovern, architect, 16, Sir Thomas's Buildings, Liverpool; quantities supplied:—

Hughes	£217 0 0
Sharp, R. and J.	206 0 0
Wilkinson and Adams	199 0 0
McKenzie	178 0 0
Thompson	176 5 0

LIVERPOOL.—For the alteration of premises, North Hill-street, Liverpool, for Mr. R. Douglas. Mr. Walter W. Thomas, architect and surveyor, Liverpool:—

Nicholson and Ayre	£260

NEWPORT, ESSEX.—For the erection of the Congregational Chapel. Mr. Charles Pertwee, architect, Chelmsford:—

Lindall, Cambridge	£1,614
Dix, Saffron Walden	1,168
Cornwell, Bishops Stortford... ...	1,156
Staines, Newport	958

NORWICH.—For erecting waterworks at the new Borough Asylum from the designs of Mr. W. W. Lake, city surveyor, for the Town Council:—

Sturgess and Towlson (accepted) ...	£1,196 16 0

NORWICH.—For alterations of pens in the Sheep-market for the Town Council. Mr. W. W. Lake, city surveyor:—

Barnes, John (accepted)...	£73

WESTON.—For new brick water dam with wrought-iron floodgates, &c., on the river Tame, near Weston, Oxon, for Mr. Alfred Howland and Co. Mr. Horace Jardine Heath, architect:—

Barton (accepted).

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Holloway's Pills are the surest preventives of the many maladies begat by wet, damp, cold foggy weather. Under the influence of this purifying medicine the blood is kept pure and the lungs free. An occasional dose during the winter months proves salutary to all exposed to vicissitudes of temperatures.

Lamplough's Pyretic Saline is refreshing, most agreeable, and the preventive of FEVERS, BILIOUSNESS, SMALL-POX, SKIN DISEASES, and many other spring and summer ailments. Sold by chemists throughout the world, and the Maker 113, Holborn Hill. *Use no substitute.*—[ADVT.]

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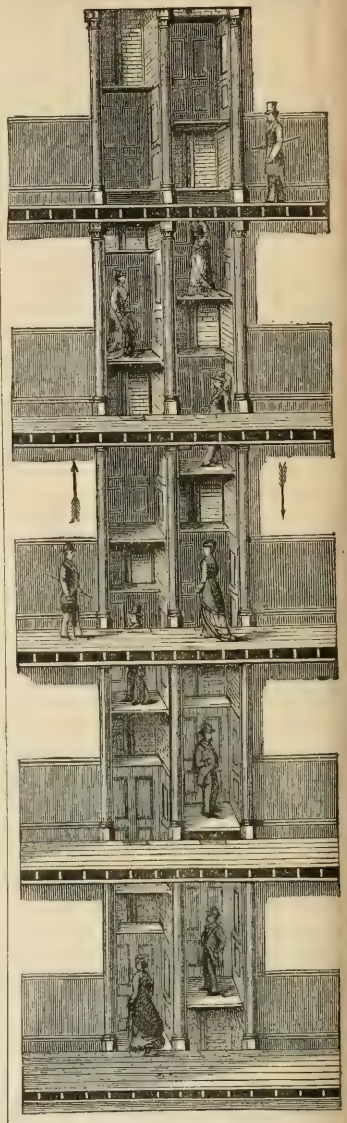

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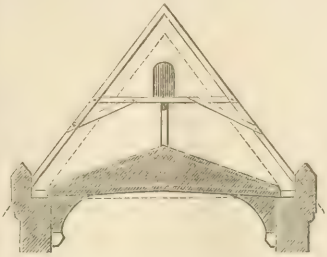
THE BUILDING NEWS.

LONDON, FRIDAY, DECEMBER 6, 1878.

THE ST. ALBAN'S ROOF CONTROVERSY.

THE St. Alban's roof controversy is still engaging the attention of archæologists and architects, and from a report we publish to-day (p. 597) of the proceedings before the Society of Antiquaries, it will be noticed that a resolution has been passed by that society opposing the substitution of a high-pitched roof for the present flat roof over the nave. It will be needless here to restate the many arguments that have been advanced for and against a new roof, though as far as we can judge the whole question turns so intimately upon the actual condition of the present roof that it is curious such conflicting views should have been entertained. If the present roof be in a state of decay beyond repair—if in fact one-half the timbers of it are so rotten that they cannot be retained, we should, without a moment's hesitation, recommend the construction of a high-pitched roof over the nave as a common-sense method of restoration; but it now appears, on the authority of Messrs. Street, Blomfield, and Christian, as well as from an elaborate paper read by Mr. Neale, that at an extreme calculation only about one-fourth of the existing nave roof is in a state to require repair, that of the 32 principals which compose the roof 12 were strengthened or renewed by Sir Gilbert Scott in 1839, and that the flat ceiling may be substantially repaired. (Sir Gilbert Scott and Mr. J. O. Scott have, indeed, acted under this persuasion.) If these statements are facts—and we cannot now call them in question—it is obvious there is no necessity to tamper with the old work, and it is equally certain that any desire to substitute a higher roof for the present one must be looked upon as matter of taste rather than of actual requirement. It is clear that the controversy has now been reduced in its dimensions. At first the question at issue was whether an old, flat, rotten, and somewhat debased roof should be preserved as a matter of antiquity and picturesqueness. It is now simply whether a substantial roof, admitting easily of necessary repair, should be replaced by a higher roof on architectural grounds.

Let us first simply recapitulate the reasons brought forward by Mr. Street, Mr. Christian, and Mr. Blomfield, in favour of simple reparation, and at the same time we may express surprise that the advocates of the high roof were not more numerous than they appeared to be last Thursday, for their opponents had it all their own way. We cannot wonder that Mr. Street made out a strong case. One of his arguments was based upon the assumption—not at all untenable, and which we suggested in our own remarks some time ago—that the existing flat roof was an intentional substitution—a re-adaptation of the material of the older Norman roof of high pitch by the architects of St. Alban's, and not a mere makeshift of later time, as asserted by many. This opinion does not at all agree with that broached some time since in the *Times* by Professor Donaldson—namely, that the roof was of the 16th century and that its flat pitch (prevalent at that time) resulted from the "necessity of carrying out, in the most inexpensive way, the reparation of roofs then generally decaying after three or four centuries." There is certainly a strong *primâ facie* argument that this reparation was effected by using up the old rafters which had become unsound at the ends, and working them up into shorter timbers of low pitch, and Mr. Street himself mentioned the fact that a great deal of the old timber had been re-used, the present rafters having been cut out from the former ones. On the other hand, it may be contended that the flat roof, if it originated from economical considerations, also expressed the taste of the period—the style itself was becoming more depressed in its features; and further the scantlings and workmanship of the roof, according to Mr. Neale's paper, disprove such a theory. Mr. Street says the whole eastern portion was designed for flat roofs; and he assigns the date of the nave roof between 1494 and 1596. As to the ceiling, he believes it to be the original Norman one, repaired and re-painted; and it would be impossible to replace any part of it, if removed. But the strongest reason urged by Mr. Street is that the roof is in a condition of soundness to admit of reparation. The four or five eastern bays only would require renewal, the other portion could be rendered sound by some extra bolts and braces. Other objections to a new roof, as suggested by the Building Committee, were more æsthetic. A high roof would reduce the apparent height of the tower, giving it a stumpy appearance like that of Winchester. It would also necessitate similar high roofs over the transepts—a serious additional expense. The parapets offer a point of some consideration. During the existence of the original Norman high roof there was no parapet, but only a corbel-table (this has been proved by Mr. Street); but we cannot endorse the opinion that, if a high



roof is constructed, the parapets must necessarily be removed, because the original roof was without them. The western part of the parapets is being rebuilt in stone; but should a high roof be decided upon, we do not see any objection to the retention of the parapets. Why should the reproduction of an older roof be considered necessary? The diagram we give shows the three alternative roofs as described by Mr. Street. The hatched part shows the existing roof, the outer line of rafters indicates the line of original roof, and the dotted line the line of steep roof, if gutter and parapet are retained.

The question of covering has lately occupied attention. Mr. Street protested against the use of fir covered with any material, and a letter in the *Times*, written by Mr. Luke Limner, F.S.A., strongly pleads for copper as the best material when lightness and durability are concerned. He adds, and with some truth, copper has been much neglected by architects, and hopes that some day "a dome of copper gilt" like that of the Kremlin in Moscow, may be erected in London. Another writer in the *Athenæum* supports this material, and instances the roofs and domes of large churches in Valencia. There can be no doubt of the suitability of the material as a roof covering, and its colour and reflecting surface are qualities strongly in its favour. Regarded from a practical point of view the re-roofing of St. Alban's Abbey has now been reduced within practical limits, and after all the personalities that have been indulged in by the champions of reconstruction or reparation, the issue should resolve itself into one of careful inspection of the timbers and ceiling, dismissing from consideration other issues of æsthetic and abstract architectural fitness.

We are sorry, however, that both sides of the question were not represented so fully as we could have desired. Mr. Micklethwaite challenged the position taken up by the committee; he had certainly a good ground in the abstract for denying a positive assertion that we had no right to tamper with old roofs nor to substitute a high pitched for a low roof; and we quite agree with him that if no special reasons existed, as they do in this case, it would be absurd to deny an equal right to us to erect a high-pitch roof in the 19th century that the men of the 14th century had to substitute a low for a high roof. The speaker also referred to Selby Abbey and other restorations by Sir Gilbert Scott. Mr. Seddon spoke in the same strain. We may reassert that in the present case æsthetic grounds must yield to the economic and necessary. We should have liked however, to have heard Mr. J. O. Scott's explanation of his recent report, in which his first opinion has been altered; probably he has some good grounds for thinking a new roof necessary, and could at least rebut the charge of obsequiousness brought against him by one of the members the other evening. There are good reasons sometimes for changing one's opinion, although they need not be publicly proclaimed; but it would insure greater confidence in the decision of the committee if their architect would state the convincing arguments which led him to acquiesce in August in a course to which he was opposed in June.

SOCIETY OF BRITISH ARTISTS' WINTER EXHIBITION.

THE Winter Exhibition of the Society of British Artists, in Conduit-street, maintains its excellence for the class of pictures it has so long contained. Ideal or high art makes but little show upon the walls, but the pictures are those everybody can admire and intelligently understand. As one of our best popular exhibitions it has generally patronised works of a kind not very sensational on the one hand, nor academic on the other. The bulk of the works display a variety of incident and artistic sentiment, from the grave to the gay, and from the most commonplace to the sentimental. Taking the large room first, "Stirring Events in the Village" (No. 3), by Mr. A. Ludovici, is one of those pictures a visitor is not likely to see and forget. Its title is a good one. It represents a very everyday circumstance of country life—an itinerant organ-grinder, around whom is thronging a group of merry children in gleeful anticipation. At the gate of a country tavern stands an old man and his daughter, as much attracted and pleased as the juveniles at the unexpected stranger. The figures of the children and the trees in the background are effectively painted. No. 2, "St. Paul at Jerusalem," by Mr. P. Priolo, is a subject taken from Acts xxii., v. 22. There is a well-chosen combination of colour in the picture. We pass on to notice a clever sea-piece, in which the artist has caught the reflection of a rippled sea. It is entitled "Going to Market at Roundstone from Deer Island, West Coast of Ireland" (22), by Mr W. H. Bartlett. The old man pushing off his boat is well rendered. "A Tiff," by Mr. A. Ludovici, jun. (41), exhibits one of those readily-appreciated accidents of courtship which, in the hands of a skilled delineator, can be made attractive. The artist in the present instance has selected a costume that removes the subject out of the domain of the vulgar.

One of the principal pictures in the large gallery is "A Labour of Love," by Mr. L. C. Henley. A monk, seated in his cell (45), is engaged carving a crucifix; the work is nearly finished, and the expression of the artistic recluse is thoughtful, and well conveys the impression of a labour of love sought to be realised by the artist. "A Breezy Day on the Coast" (75), by Mr. T. F. Wainwright, M., is a large and richly-painted subject, rendered with much fidelity and feeling, and one which well sustains Mr. Wainwright's reputation as a painter of marine effects and atmosphere. The sea is intensely green; and we can almost see the breeze in the ruffled and vapoury effect of the waves and the cattle in the foreground. Another subject that will enlist attention is "All Serene" (97). An old man is seated at a table, upon which is a plate and the remains of a mutton chop, to which he appears to have done full justice, if we can judge from the well-contented look upon his rubicund countenance, and his clasped hands in front. A pathetic picture, exhibiting a tenderness of sentiment, is "The Tired Mother" (106), by Mr. J. T. Peele, M. The mother has fallen asleep over her double duty of attending to the baby in the cradle and peeling the potatoes which lie on the floor. The story is well told, and the handling vigorous. "Glad in Sunshine, Revered in Storm" (108), by Mr. J. E. Jacobs, is a charmingly composed and painted picture of beech trees. As a study of expression "A Serious Study," by Mr. W. H. Gadsby, M., is worth looking at; and as an architectural piece of effect, "A Gloucestershire Gable" (132), by Mr. J. Rushton, demands notice for a conscientious handling id drawing and colour. No. 141, "Street and Gate of Rue Jersual, Dinan, Brittany," by Mr. S. B. Clarke, is another skilfully-painted study of street architecture. The gabled fronts and the timbering are well and transparently coloured. One of the clever homely subjects of infantine acquisitiveness is numbered 142 ("Sugar," by Mr. John Morgan, M.), in which a child's head and hands appear above a cloth-covered table, about to help himself to the sugar. The story is told simply and unadorned, without unnecessary accessories, which, by their completeness, render homely incidents often ridiculous. Another equally pleasing and skilfully-depicted subject is under the title of "The Long Sermon" (187), by Mr. W. N. Gadsby. Two little girls are seated in an old-fashioned pew, one having fallen asleep under one of those laboured and tiring discourses country rectors are prone to indulge in. The background and the face and frocks of the juvenile occupants are painted with much fidelity, and remind the visitor of the preciseness and decorum of a country church of a past generation. "Fountain in the Apse of Freibourg Cathedral" (188), by Mr. Wyke Bayliss, M., shows some clever painted stonework, with the effect of sunlight upon the fretwork of the fountain. The detail is not of that slipshod character common with oil-painted architectural subjects. "Still Life' (190) is simple and telling, by Miss A. M. Mott, and another study under the same title (253), by Mr. Manton, is charmingly real in the texture of the grey earthenware vase against a carved bas-relief. Mr. A. J. Woolmer, in his "Haunt of the Sea Nymphs"—one of the lions of the exhibition this year—sends a subject which he is well able to portray without being chargeable with offending the prudish. His nymphs in this picture are lost in the grand sunset effect lit up with irridescent hues, and the cave and still water might make us imagine we were looking at some theatrical scene. As a work of composition and colour it will take a high place. "Indecision" (235), by M. H. Caffieri, M., is a picture that will draw many votaries of feminine beauty. A young lady in a light blue dress is reading a letter. On a table lies a bunch of loveliest flowers, and behind her is a dark Japanese cabinet effectively painted. The hat and sunshade on the chair, and the circular mirror on the wall, are admirably expressive, and the chiaroscuro is good. We hardly know which to admire the most, the figure of the damosel or the colouring. Mr. R. J. Gordon's "Gold Fish" is an admirable piece of colour and chiaroscuro. A girl in a reclining position, in *négligé*, seated on a skin mat, is watching the movements of gold fish in a tank in the foreground. The classic surroundings and handling are redolent of wealth of the ideal and a pleasing repose. Occupying a central place in the west gallery is Mr. G. H. Barrable's "Prayer" (308)—a youg girl clad in a red robe kneeling. The red is perhaps overpowering in the canvas, though the dark ground well relieves the whole figure, and the countenance is certainly devotional. A large dark landscape (298), the "Monk's Walk," Tivoli, Rome, by Mr. H. Zimmerman, shows some massive colouring. "A Duet: Alla Moda Antica," by Mr. F. S. Muschamp, has some richly-painted accessories and dresses, and is not wanting in some of the higher qualities. A very attractive picture is 352, "Croquet," by Mr. E. Hughes. The figures of the young ladies and their light dresses are truthful, and characteristic of the croquet lawn. The interest of the painting resides in the figures, and the background is dark and massively painted, with the intention of throwing the figures into prominence. Mr. Hughes has skilfully accomplished this object. "Five o'Clock Tea," by Mr. A. Verey, is a clever tea-garden group. We can only very briefly mention a few other pictures. Mr. C. A. Smith has told a plain domestic everyday incident in "Passing Thoughts;" good in conception, quiet in colour. In Mr. Bryant's "How much for the Magpie?" (384), we have a painstaking picture of market produce, minute in detail, but lacking grouping. Of landscape subjects the exhibition has some very creditable works; and we are glad to find so many rising artists following truthfulness rather than mere "effectiveness," which a few artists adopt in pandering to popular taste. Such pictures as "The Doone Valley, Exmoor," by Mr. S. Hodges, "A Cornish Homestead," by Mr. D. Knowles, "St. Monance, Fife," by G. Gray, and "A Tranquil Spot" (70), by Mr. S. G. Rowe, speak for themselves. Mr. S. G. Rowe's "Tranquil Spot," for instance, shows a patient realisation of rural beauty. The retreat itself is a charming bit of scenery; and the horse drinking, pond, and foreground are transcripts of nature we cannot doubt. "Oxwich Castle, from the Marsh" (228), by Mr. G. S. Walters, is a sunny still effect, and the handling is good; "Across Country" (303), by Mr. A. Verey, is clever; "Oat Harvest" (325), by Mr. J. Clayton Adams, has some excellent points in colour; and "Foot Bridge, Sunbury-on-Thames" (372) is a fine softly-painted landscape. "A Storm Cloud, Cannock Chase" (383), by Mr. B. Evans, is cleverly painted in the heath, though the clouds are crudely defined, and perhaps rather too inky black on the horizon; "Near Bournemouth," by A. H. Davis, is a study of the pines which skirt the sea-coast; and 394, "The End of the Day," by L. Rivers, is a large forcibly-painted landscape, in which a labourer and his wife are trudging home, the dusk of evening pervading the scene. "Still Life Chinese" (11), by Mr. P. H. Miller, "After a Hot Day" (32), by S. Lloyd, "Wide Awake" (91), by Mr. R. W. Wright, "Seaside Acrobats," by A. Ludovici, "Flowers" (137), by Mr. W. Muckley, "The Morning Paper" (149), by M. Caffieri, "Cymmer Abbey, North Wales" (204), by Miss Peel and "Azaleas" (242), by Mr. P. Sydney Holland, are all noteworthy pictures.

The water colours are, on the whole, meritorious; and we do not observe many that affect tricky oil manipulation and effects—a common vice among inferior water-colour painters. "Caudebec, Normandy" (409), by Mr. T. Dibdin, is spoilt by its harsh drawing. The old church of Notre Dame looks too much like a copy from a small print, though an excellent subject for the architectural artist. "A Devonshire Lane" (412), by E. H. Bearne, is a pleasing bit. Mr. Hall, in his "View on the River Brathay" (423), a moonlight effect, is certainly not happy with his water. The shadow of a tree looks more like a smudge. On the screen we observe some charming sketches. Mr. D. Law's "Whitby" (502) is a fine picture; and the artist, whose works are familiar to us, has produced an evening effect of considerable depth and tone. Another piece "Cattle in the Meadows" (337), by Mr. Baldock, is rich in gold autumnal tints. Mr. Wilkinson's "Silversmith's Arch, Rome" (551) is a careful drawing of an interesting structure, while Miss F. G. S. Best's "Sunflowers," and Miss Edelston's "Autumn Leaves" (545) are as admirable renderings of nature as they are charming in colours. We can only enumerate further, "Under the East Cliff, Whitby" (404), by R. Crafton; "An Autumn Evening," by Mr. A. Powell, soft in its aërial tints; 417, "Abbot's Hospital, Guildford," by Miss M. Beauchamp; "Near Dalmally, Loch Awe," by Mr. A. E. Green; "Kenilworth Castle" (466); "The Avon, near Bristol," by Mr. W. Harford; "A Cool Retreat on the Common" (484), by Miss Hanbury, a rich study of yellow bloom; "A Rugged Spot among the Welsh Mountains" (456); "Caudebec, Normandy;" "Ruins of Houghton House, Ampthill" (489), a plain sketch of Elizabethan entrance; "Entrance to Chapter House, St. Martin, Boscherville" (490), by Mr. F. P. Barraud.

THE CONDITION OF THE THAMES AT LOW TIDE.

A SECOND visit of inspection of the River Thames was made on Saturday last, with the object of examining the banks of the river during low tide, or the period between the last of the ebb and the first of the flood tide. Sir James Hogg, several members of the Board, with Sir Joseph Bazalgette, Messrs. Law and Chatterton, and others who accompanied the party on the previous Saturday excursion, were present on board the Duke of Cambridge, a steamer drawing 18in. less water than the Alexandra, and proceeded down the river. Various samples of the water were again taken from London-bridge to below Crossness, which generally gave similar results to those we recorded last week. We will here confine our remarks—first, to the condition of the river at low tide and the observations made on the banks; secondly, to objections and conclusions that may be drawn from them; and lastly, to the question of reduction of pollution. We desire especially to consider the question at issue between the Thames Conservators and the Metropolitan Board of Works in as impartial a manner as possible, reviewing simply the actual facts of the case, weighing the evidence on each side, and drawing only such conclusions as must in every practical mind be considered demonstrable. Unfortunately the whole subject has hitherto taken the complexion of a party question; nor can we wonder at this when it is considered the interests of the Conservators and the Metropolitan Board are clearly at variance. The Thames Conservators have to

protect the river from pollution and maintain a navigable channel, while the Board of Works, acting in the interests of the ratepayers, have to dispose of the vast accumulation of London sewage in the easiest and least troublesome manner possible. One has to preserve the purity of the river—the other is compelled to pollute it in the absence of a better mode of sewage disposal. From London-bridge to the Commercial Docks the samples of water taken on Saturday were usually of a yellowish dirty colour, largely attributable to the scourings of wharves, vessels, and other refuse. At Deptford Creek and Greenwich Pier there was a little more matter in suspension, due to the detritus of the banks at the piers. At East Greenwich, off the telegraph works, the water taken was also thicker, and this condition continued till the steamer had passed Woolwich Pier; thus, off the Victoria Docks the specimens were decidedly cloudy, and at Woolwich quite muddy. The banks near the latter pier, we observed, presented a thick slimy coating upon the shingle, but the exact nature of this deposit was not ascertained, though in all probability it may be caused by the action of the steamers stirring up the very muddy water at this part. A little lower down, close to the Powder Magazine off Tripcock Point, and at the site of the recent fatal collision, the steamer stopped, and a sounding was made with a rod shod with iron. Several strikings of the rod upon the bed of the river in mid channel revealed only a firm resistant bed, with no mud, and a depth of 20ft. was recorded. A grapnel let down only brought up a flint, and the water was tolerably clear and rather milky in appearance. Another sample of water, taken 3ft. from the bottom of river, was a trifle more turbid. The passengers now had their attention called to the Beckton Gasworks, the banks near which, we noticed, were covered with a coating of a greasy slimy nature, and the mud being of a black, or rather greenish hue, from which a strong smell of tar or gas products was perceptible. Off Barking outfall another stop was made; the sounding showed a depth of 14ft., with little mud. Exactly opposite the outfall, about 100 yards distant, the bar brought up dark mud. At another place the depth was only 2ft. 9in., and the bottom muddy, and a fifth sounding showed a less depth, and a blackish oily silt-like deposit. About 50 yards off the outlet a sample of mud was taken possessing a strong sewage odour and black, though the water was of ordinary clearness. At Barking Creek a thin, floating, greasy matter, apparently from gasworks, was observed upon the surface of water eddying here and there, and making its way into the channel. An exploring party left the steamer in a boat, and ascended the creek about 100 yards, and took a specimen; the water was cloudy and muddy. A little below Barking the water assumed its usual clearness, and the sample was the clearest of the whole previous samples. At Leather-bottle Point, off Crossness, the banks show mud deposits, especially in the eddying bends of the stream. At Crossness an examination of the banks was made opposite the chief outlets. The sounding in one case was eight feet, and the mud taken was of a blackish kind, but no offensive smell could be detected. Another sample squeezed out of the boring tube (to which specimen the not inappropriate name of "Crossness sausage" was given), taken on the south side, opposite the lower outlet, was distinguished by similar qualities to the last, and had the consistence of putty, though black. Below Crossness the creek and foreshore are covered by a clayey deposit. One of the enthusiastic officers of the Board volunteered to walk up the foreshore from the river's edge, and to obtain a specimen of the bank. The bank was found to be of clay; the sample of mud procured close to it was of similar quality, though of a dark blueish hue, not unlike former examples. On the return journey, at Broadness Beacon, attention was called to the crumbled condition of the banks and headlands; and, according to the Admiralty charts, a considerable erosion has been going on—so much so that the beacon, formerly standing inland, is now at the very verge of the river. The soil at this part is chiefly loam. It is very obvious that the action of the river has undermined and washed away an immense quantity of these banks; and no doubt the swell of passing steam vessels has considerably increased this crumbling away, as asserted by Capt. Burstal. At Northfleet Hope a sample of water on the Kent side was found to be quite thick and flaky, showing the amount of loamy material in suspension; and Sir Joseph Bazalgette drew the attention of visitors to the floating masses of loamy matter, due to the disintegration of banks. Opposite Gray's Thurrock the mud was found black and clayey, water rather saltish and clear; at Long Reach Tavern it was clear and brackish; and at the outfalls, corresponding with the points previously taken, and two hours before flood tide, the dips were of tolerable clearness, and agreed with those taken in the journey down.

We are somewhat sorry a more complete examination of the banks and foreshore were not made; but the foggy state of the atmosphere, and the time at disposal, precluded a closer inspection. No one can deny that in the creeks and bends a large deposit of mud is formed. Wherever there is a quiet eddying corner, there the shores exhibit an accumulation of mud or detritus, and it is equally certain that a large portion of it is to be attributed to the crumbling away of the banks and saltings. If we turn to the survey of the river made by the Admiralty, we find certain variations to have taken place in the bed of the river, and along the banks. In the chart showing the low water conformation in 1857, we observe an area of 679 acres, from the Victoria Docks to Purfleet, in which the depth is less than ten feet below low water; while in the chart of the same portion, from a survey by Capt. F. Bullock and Capt. E. Burstal, corrected from surveys of the Thames Conservancy Board up to the present time, there are only 405 acres of that depth. Capt. Burstal, in his observations, refers to various changes in the shore line, by which it appears that at Mucking Bight the shore line of salting is at least 100 feet further out in the river than it was in 1834; and at Higham a similar encroachment on the river is noticed. On the other hand, we find the river has undermined and washed away prominences, as at Broadness Saltings, Long Reach, Tilbury Marshes, and other parts. These are phenomena which every one acquainted with river channels know well enough, and they are accounted for in numerous ways—such as embankments, alterations in drainage areas, piers, dredging, tidal influences, and by the slower process of abrasion of the banks of the alluvial and tortuous portions of the river. We do not think soundings taken in mid-channel prove much, as the scour of the tideway prevents any deposit in this part; and for this reason a more minute examination of the banks and foreshores is demanded. If we rely upon the Admiralty charts of the low-water features of 1857 and 1871, the navigable channel is found to have greatly improved; for while in the first-named year the area representing 20 feet depth and upwards is put at 622 acres, in 1871 the area of that depth is increased to 1,206 acres—or, in short, in the space of fourteen years the deep water area of the bed of the river has been doubled. We look forward with some interest to the analyses to be made by the Board's chemist, Mr. Keates, as these will prove beyond doubt whether the muddy deposits on the foreshores are composed chiefly of organic matter or alluvial detritus. The Board of Works and the Conservators, we may add, explain the improved channel upon different grounds. The former attribute the change to the drainage and improvements of the banks, the latter to the dredging carried out by them. Messrs. Bazalgette, Law, and Chatterton contend that one million tons of soil are washed into the Thames from Greenwich to Yantlet Creek every year, and that this is the mud deposit on the banks which Capt. Calver declares is caused by the sewage, while the rejoinder of the last gentleman is to the effect that if this be so the flood stream carries up loam of a heavier specific gravity from the lower reaches (from the cliffs of Sheppey) than that of sewage mud much lighter, which the engineer of the Board has denied. In this argument the Thames Conservators have apparently the best of the Board, and it will be therefore for the latter to reconcile the discrepancy as to the relative specific gravities of soil and sewage deposit, if they still maintain the theory of the greater transporting power of the ebb tide. One important fact which appears to have been disregarded is the effect of dredging on the river—how far it has actually improved the channel, as asserted by Capt. Burstal. We have it, on the authority of wharfingers and seafaring men, that large deposits of mud are being formed opposite the wharves and steamboat piers as far up as Westminster and Waterloo. Another point is the relative amount of solids in the river. The Conservators find, on analysis of samples taken by them, 55 grains of solid matter in a gallon, while the Metropolitan Board can detect only 23·06 grains in a gallon; but this is a discrepancy we hope will be easily explained. Oxygenation is constantly going on, changing the character of the sewage deposits. Mr. Leach the engineer to the Conservators, has compared the solid matter produced from the Birmingham sewage with that of London, and calculates that if 450 cubic yards per day is placed on the land at the former place, upwards of 4,000 cubic yards of solid matter passes into the Thames daily, the precipitation from which is quite enough to account for shoals. This estimate is probably above the mark, as the sewage of London is more diluted than that of Birmingham; be this as it may, it is a point to be cleared up before we can determine with any precision the amount of actual shoaling that is going on.

In conclusion, there can be no doubt, as we have said, that accretions on the bed and banks are going on, though in a much smaller degree than is alleged; the silting up has been exaggerated. As to a degree of pollution there can be but one opinion, and the practical question arises how the pollution of the river can be diminished. We must not shut our eyes to an evil the gravity of which is increasing rather than diminishing. The Thames, no doubt, is an exception to most rivers. Below London the river flows between comparatively open marshes and uninhabited flats, and dense populations are not likely to congregate along it. Still, the Board of Works are bound to look a little in advance, and to diminish by every practicable means the ill effects of so vast a discharge of sewage into the river. They must consider the present outfalls as tentative—rather the only practicable solution of a great difficulty felt years ago than as the best practicable means of disposing of the London sewage for the future. London itself has nearly doubled its population since the main drainage scheme was first proposed, and the condition of the Thames water must be acknowledged to deteriorate

rather than improve. A process of utilisation appears to be the only feasible of all plans of purification. Chemical processes have been suggested, but pronounced inadequate, and companies have shrunk from undertaking so gigantic an enterprise; but there is one process within the limits of realisation—namely, irrigation. Doubtless the cost of any scheme will be large, but some process of utilisation must be entertained sooner or later, and we believe the Board are inclined to adopt any fair proposal.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

An ordinary meeting of the Institute was held on Monday evening; Mr. Charles Barry, President, in the chair. Messrs. James Williams, of her Majesty's Office of Works and Public Buildings, Whitehall, and John Oldrid Scott, 31, Spring-gardens, were elected as fellows; Mr. Chas. Edward Barry, Westminster Chambers, as associate; and James Colborne Baron Seaton, of the Albany, W., and Beechwood, near Plymouth; and Messrs. Francis Tagart, 199, Queen's-gate, W.; Henry Andrewes Palmer, St. Stephen's Parsonage, Dulwich, S.E.; Henry Simmonds, Aylesford House, Denmark-hill, S.E.; and Chas. Henman, fellow, of 7, Bedford-villas, Croydon, were elected honorary associates. M. Gabriel J. A. Davioud, 108, Boulevard St. Germain, Paris, officer of the Legion of Honour, and architect of the Palais du Trocadéro, was elected by acclamation as an honorary and corresponding member. Amongst the nominations for membership was that of John Everett Millais as honorary associate—an announcement received with applause. The secretary notified several donations to the library; and the president, in proposing a vote of thanks to the donors, specially alluded to Mr. R. J. Withers' contributions of drawings of buildings recently restored by him, and appealed for further additions to the collection.

THE ROOFING CONTROVERSY AT ST. ALBAN'S.

Mr. James Neale, F.S.A., said it might be remembered that in July last a report was prepared for the Institute, stating that the ruinous and rotten condition of the roof timbers over the nave of St. Alban's Abbey had been exaggerated, and that the present roof might be repaired and rendered perfectly sound and serviceable. These statements had been confirmed by Messrs. Street, Christian, Blomfield, and W. White, after special visits to the building, and the Society of Antiquaries had passed a resolution deprecating the proposal to substitute a high-pitched roof as opposed to the principles of all sound restoration. He asked what action the Institute council had already taken in the matter, and what they were now prepared to do? If action were to be taken, it must be immediate, for a contract had been signed. The President said he had allowed Mr. Neale to interpolate this question, for the subject was one of interest and importance, and he thought that the action of the Institute ought not be delegated, because it might possibly be coincident with that of the Society of Antiquaries. He attended the meeting referred to, and could say that the decision of Messrs. Street, Blomfield, and Christian was unanimous that the nave roof could be restored. Amongst architects, at any rate, their opinions were entitled to more respect than those of the committee who happened to have the charge of the alterations—it would be a mistake to call them restorations—at St. Alban's Abbey. He hoped he should be allowed to answer Mr. Neale's question, that the subject should receive the careful consideration of the council, and that they would advise the members upon it.—Mr. Street explained that the reports made to the Society of Antiquaries on the previous Thursday were the results of the Institute committee for the conservation of ancient monuments.

THE HIGH SANCTUARY AT JERUSALEM.

Lieut. Claude R. Conder, R.E., read a paper detailing the principal results of the explorations in the area of the High Sanctuary at Jerusalem, carried out during the past twelve years by professional engineers and architects, including the Ordnance survey by Major Wilson, in 1864, the excavations by Capt. Warren in 1867-9, the explorations by M. Clermont Ganneau and M. Le Comte in 1874, and the lecturer's own work in 1873-5. Two questions entirely separate from one another were included in this inquiry. First, that of the Jewish buildings in the area, and of their existing remains; secondly, that of the various Christian and Moslem erections dating later than the Christian era. The great enclosure called Haram-el-Sherif, or "High Sanctuary," the lecturer explained, is a trapezoid area, partly founded on rock, partly formed by earth, which is supported on extensive vaults, and banked up between retaining walls of magnificent masonry. The total extent is about 35 acres. A platform—an irregular quadrangle in outline, and 5 acres in area—rises in the middle; its surface is paved, and, roughly speaking, level, being about 15ft. above the exterior. The remainder of the Haram has an irregular surface, and is planted with olives and cypresses. The two principal buildings on the platform are the octagonal chapel called Kubbet-el-Sakhrah, "Dome of the Rock" (popularly but erroneously termed the "Mosque of Omar"), and due east of this the smaller decagonal chapel called Mahkamet Dâûd, "Tribunal of David," better known as the "Dome of the Chain." Their position is not central, nor is their axis square of the platform. Two smaller domes exist north-west of the main building, and on the north, south, and west small modern chambers are built against the sides of the platform. The mosque itself, called Jamia-el-Aksa, or "the remote meeting house," is built against the south wall of the Haram, over a long vault running north and south. On the east wall of the Haram is the fine double gate-house called Bâb-el-Tôbe, or the Golden Gate. In the south-east corner of the enclosure are the extensive vaults known as "Solomon's Stables." In the north-west angle is the minaret standing on a rock scarp near the barracks. Cloisters surround the open area of the Haram on the north and west, and numerous ancient tanks and passages exist below the surface in all parts of the enclosure. Having thus generally described the Haram enclosure the lecturer went into details as to the rampart walls, of which those on the west, south, and east have been thoroughly examined. Three kinds of masonry are found throughout—firstly, megalithic drafted masonry; secondly, large and well-wrought ashlar without a draft; thirdly, small masonry, a patchwork of plain, chiselled, and drafted stones of various dimensions. Throughout the enclosure the masonry occurred in this order, and he considered the second as Byzantine, and the small stones above Crusading and Saracenic. The largest known of the ancient drafted stones is at the south-west angle, and measures 38ft. 9in. in length. The north-west angle of the walls is occupied by a large scarped block of rock, rising 40ft. above the Haram court; it is partly covered with barracks and other modern buildings. On the north face are the Twin Pools, two parallel reservoirs 40ft. below the present road, formed by roofing in part of the old fosse between the Haram and the higher hill to the north. The Pools have been called those of Bethesda, and are roofed with Early Byzantine waggon vaulting. From the S.W. corner of the Pools a magnificent rock-cut passage—once an aqueduct—runs south for 200ft., diminishing from 50ft. high to about 6ft. It ends by a turn towards the Haram wall, on the other side of which are cisterns with which it once communicated. At this extremity two of the buttresses, with which it was long suspected the Haram must have been adorned, were found, *in situ*, in 1873. The west wall of the Haram is mostly hidden by modern buildings, except at the Jews' Waiting-place, and the ancient entrance or Prophet's-gateway adjoining. At the south end of this wall Dr. Robinson discovered the now well-known skewbrick of an ancient bridge, and beneath the *débris* Captain Warren subsequently found a voussoir of a second and yet older bridge. The south wall is roughly trisected by the two passages leading to the double and triple gates, which have their sills on a level with the Prophet's-gate, 60ft. below the top of the wall. In this wall Captain Warren found a master course of stone, extending westwards for 600ft. from the corner, and no less than 6ft. in height. It is continued on the east wall, clearly indicating that the walls throughout form a complete structure. The east wall has been examined in five places, resulting in the discoveries that the great wall runs past the present north-east corner of the Haram without any break; that the masonry north of the Golden-gate is of a distinct character, and much rougher than the rest of the wall, and that a valley, 140ft. deep, runs across the north-eastern part of the Haram enclosure. This wall is placed probably later than the other three. Against the face of this wall is built the great reservoir known as the Birket Israil, which seems to be a work of the 12th century. The first point of interest within the Haram is the rock itself, and it is only by tracing the rock that we can ascertain the original form of the hill, and the depth of foundations needed to support the Temple buildings. A spur of hill runs from N.W. corner of angle and falls 60ft. to the Triple Gate. Under the dome of the Kubbet-el-Sakhral is the original surface, the highest crest being 5ft. above the chapel floor; beneath it is a cave 25ft. sq., and 7ft. high, entered by steps. A shaft is sunken through the rock to this cave, and another is said to exist beneath it. The platform is unsupported on vaults on the S. and N.W., and on the S.E. are built-up doorway and two windows never yet explored. It appears, Mr. Cowden said, that the masonry of the walls surrounding the Haram is of the date on the east, south, and west, and that no straight joint or break has been found in any part. He asked: Is this area of the High Sanctuary to be identified with the Temple enclosure in its final condition, when enlarged and rebuilt by Herod? The dressing of the masonry seems to show that it is of the date of the second or late bridge at the south-west corner, which cannot well be earlier than the time of Herod; again, the fact that three ancient rock-cut aqueducts were built across, and so rendered useless in constructing the Haram walls, indicates a comparatively late date for the drafted masonry, which, however, cannot be later than Herod's time. It is generally agreed that the great bridge in the south-west angle of the Haram is that described by Josephus as leading to the royal cloister of Herod's Temple. The description given by the same author of the rock on which Antonia stood overlooking the Temple, and divided by a fosse from the hill of Bezetha, so fully agrees with the appearance of the rock in the north-west corner of the Haram, that we can hardly hesitate to identify the two. At the south-east angle, Captain Warren discovered an ancient wall running from the south to join that of the Haram. This answers to the Ophel wall, which Josephus describes as running from the south to join the east cloister of the Temple; and this discovery serves to fix the south-east angle of the Haram as being the south-east angle of Herod's Temple. The ancient north boundary has not been determined. Proceeding next to consider the position of the Temple and its inner courts within the Haram, the lecturer thought Mr. Fergusson's theory, confining these to a square of 600ft. in the S.W. part of the enclosure, open to the following objections:—1st. The south Haram wall is 922ft. in length, and the master course runs unbroken beyond the limit proposed by Mr. Fergusson. 2nd. The junction of the Ophel wall at the south-east angle also points to the east wall of the Haram as being the old east wall of the Temple, and the double and triple gates correspond to the two Huldah, or "mole gates," of the Temple, according to the Talmud. 3rd. The north-west corner of Mr. Fergusson's enclosure is placed where the rock is 100ft. lower than the Sakhrah; thus there is no possibility of the existence of a rock scarp at this point, such as is required for the site of Antonia. 4th. Foundations would, on Mr. Fergusson's hypothesis, be required for the Holy of Holies, which would be from 60ft. to 90ft. deep, in order to give to the floor of the Temple the requisite elevation (as given in the Talmud) above the outer court. 5th. There are no remains of ancient rampart walls on the lines where Mr. Fergusson draws the north

and east boundaries of the Temple. 6th. The dimensions in the Talmud give an area considerably greater than that of 600ft. square. The only way in which the Temple and ground levels can be reconciled, is to place the Holy of Holies on the highest point; that spot is the Sakhrah, which is traditionally the site of the Holy of Holies. By reference to sections, Mr. Conder endeavoured to prove the correctness of his hypothesis, incidentally remarking that a cubit of 16 English inches gave almost exact results. Amongst the indications of the accuracy of this restoration the following were mentioned:—The centre line east and west through the Holy House will, if produced, strike the summit of Olivet, and it is expressly stated that the high priest on the summit of that mountain could look straight into the Holy House. There were no cisterns within the area of the Temple courts—the water was obtained from without. The existing cisterns are all outside the boundary of the courts, according to the plan. On the north-west of the Priests' Court was the great gate-house called Moked, where was the watch-fire of the priests. It is described in the Talmud as being "on a level," and occurs on the present plan in a place where the rock is about the same level inside and outside the gate. From the chamber west of this gate there was an underground passage running beneath the *Birch*, which seems to have been the passage leading from Antonia to the Temple, according to Josephus. Now from the position proposed for Moked, a rock gallery does actually run north for about 130ft. towards the great rock scarp of Antonia, and corresponds to the tunnel from the double gateway on the south. Further evidence is afforded by the gateways on the platform, which are all on productions of the lines from the eight Temple gates, the entrances to six of which can be defined. The practical lesson of the future is the importance of discovering what lies hidden beneath the platform of the Dome of the Rock, where, indeed, it is at present impossible to excavate. Passing on to the second portion of his paper the author described the buildings within the area of the High Sanctuary dating after the Christian era, especially the Mosque-el-Aksah, the Golden Gateway, and the Dome of the Rock, especially dealing with Mr. Fergusson's theory that the Dome of the Rock was originally built by Constantine, and that the cave in the rock is the true sepulchre of our Lord. As to the second hypothesis, he remarked that if the Temple stood on the Sakhrah, the true sepulchre of Christ could not have been there also. The chief objection to the first theory was, that the topographical descriptions of Jerusalem in the 4th and 5th centuries place Constantine's church in the middle of the city and north of Sion, while Arab historians agree with the Cufic inscriptions on the walls of the Dome of the Rock in attributing the building to the Caliph Abd-el-Melek in the 7th century. Into this last point the lecturer entered with considerable minuteness, detailing the mode of construction of the Dome of the Rock, which consists of a circular drum rising from 12 pillars and 4 piers with an outside screen resting on 16 pillars and 8 piers, arranged in an octagon with an outer octagonal wall. In the Atsah mosque the remains of a three-aisled basilica, found by M. du Vogüé, which he identifies with the one built by Justinian, A.D. 527, and described by Procopius. The vault beneath and the doorway of the Aksah appears to be Early Byzantine, but the chamber within the double gate is older, and is by general consent attributed to the Herodian period. It is roofed with four domes with pendentives supported by massive monoliths, which can scarcely be girthed by three men's extended arms; the details of the tracery on the domes, the vine pattern and other designs, are akin to the ornamentation of the rock-cut tombs of the first century in Palestine. It has, however, been altered at a later period. The Golden Gate and the restorations to this chamber and the Double and Triple Gates, the author ascribed to Justinian, although it had been regarded by Mr. Fergusson as of the fourth century. The Aksah contains remains of various dates. There are the fragments of the old mosque enlarged by Abd-el-Melek in 691 A.D.; the cupola is dated 728 A.D.; and there are traces of a Crusading apse and of the Templars' Hospital belonging to the twelfth century, while the façade, with its bold dog-toothed mouldings and broad-pointed arches, has been referred to the thirteenth. Capitals of Classic design are found in the interior, and bulging basket-work capitals, evidently Byzantine, while in the so-called "Station of Omar" are beautiful and intricate capitals, carved with leaves and dragons in high relief, evidently of Crusading origin. Mr. Conder insisted on the parallels between the Domes of the Rock and of the Chain in plan, style of details, and relative proportions—the latter being exactly two-fifths of the height and breadth of the former, and urged that there was no real difficulty in accepting the Arabic statement that Caliph Abd-el-Melek built the Dome of the Chain, and was so pleased with his work that he rebuilt the Dome of the Rock on the same model. In both the pillars are of various designs, and appear to be taken from older buildings (a common Byzantine practice, but not copied in the undoubted basilica of Constantine at Bethlehem), and in each case a wooden beam runs above the pillars, supporting semicircular arches, now covered with marble veneers. The screen of the Dome of the Rock is a beautiful glass mosaic—the Arabesque designs and Cufic inscription of which, he believed, from the colour and appearance, to be of one date—viz., 72 A.H. or 688 A.D. The absence of figure subjects militated against the Christian origin of these mosaics. In conclusion the author asked architects to judge whether he had made out the claim of the building to an Arab origin, and if his comparisons were correct in principle?

Mr. Fergusson replied at considerable length to the points raised in the lecture in opposition to the theories he had advanced in his work on "The Temple of the Jews." He maintained that, taking the cubit at 18in. (he had never before heard of a 16in. cubit), his dimensions of 600ft. square for the Temple were confirmed by the statements in the Bible, Josephus, and the Talmud, and agreed to within 18in. with the actual site and its buildings. There was, indeed, not one statement in the three authorities named which could not be verified. He could not understand how Lieutenant Conder had seen the underlying rock through 90ft. of solid earth so as to speak with certainty. As to the Dome of the Rock, the variations in the columns were not of the slightest consequence. They were probably taken by Constantine from the disused temples to Roman deities in the city. The connection between the design of this building and the queer little Dome of the Chain was, he believed, invented by a 16th century dreaming chronicler. All the Arabic inscriptions on these buildings were forgeries added by the Moslems when they recovered possession of the city. He vindicated his statements with regard to the larger dome, comparing it with the undisputed basilica at Bethlehem, and promised to recur to the subject at the next meeting.

The President suggested the postponement of further discussion till the next meeting, and proposed a vote of thanks to Lieut. Conder for his carefully-thought-out and interesting paper—a motion cordially agreed to.

Lieut. Conder, in acknowledging the motion, asked to be allowed to clear his reputation of attempting to look through the 90ft. of earth at the wall foundations and rock. The examination was rendered feasible by a series of 75 shafts, and by descents down these, and explorations of cisterns and aqueducts. He believed some of the discoveries on which he based his theories had been brought to light since Mr. Fergusson investigated the subject.

The President corrected a mistake in his opening address. The annual increase in the funds of the Institute during the past two years had been equal to £360, and not merely £250, as he had stated. He also mentioned that Professor Lewis and Mr. Whichcord had been nominated by the council as representative members of a committee of the Meteorological Society, appointed to investigate the protection of buildings from lightning, and asked the members to aid them by furnishing facts.

HEATING AND VENTILATION AT THE GLASGOW UNIVERSITY.

At the meeting of the Institution of Civil Engineers on Tuesday a paper was read on "The Heating and Ventilating Apparatus of the Glasgow University" by Mr. Wilson W. Phipson, M. Inst. C.E. The paper stated that, in spite of the lightness of the atmosphere, it obeyed the laws of gravitation, and was subject to those laws of inertia, in virtue of which no body could change its state of repose or motion except by acting in accordance with the forces which influenced it. In 1864, when the new university was resolved upon, a sub-committee—including, among others, Sir W. Thomson, Dr. Allen Thomson, Professor H. Blackburn, and Dr. Rankine—considered the general principles which should form the basis of the operation, to secure the most efficient system of ventilation and warming. The apparatus described was based on their suggestions. The velocity at which the air should travel at different parts of an apparatus was of great importance, as it fixed the area of the inlets and outlets of the air passages. An increased area of the inlet over the outlet of the space to be ventilated was advisable, and the distribution of air into such spaces should be at a mid level, combined with an upward and downward extraction of the air. In determining the form of the air passages, the resistance to the air in motion should be considered; in no case would it be advisable to have sharp angles or sudden contraction in such passages. The form of fan was selected on account of the good results obtained in previous buildings in which it had been used, and because it was not of a complicated construction. The volume of air evacuated by an extraction shaft depended on its area, and on the difference between the internal and external temperature that could be maintained in the shaft, which difference should not be less than from 30° to 40° Fahr. Practice proved that an allowance of 5 to 12 square feet of heating surface, at a temperature of 160° Fahr., was necessary for every 1,000 cubic feet of space to be warmed, and that the best form of boiler for an extended apparatus was the Cornish type. The apparatus consisted of a fan 7ft. 6in. in diameter, having four blades set at an angle of about 60°, fixed on a spindle parallel to the axis of the air channel, and driven by a direct-acting 8 horse-power steam engine. It drew its supply of air from a height of 100ft. above the level of the ground, and forced the air through a series of passages into five distinct chambers. In these chambers the fresh air was warmed, previous to its distribution, by being passed over the surface of 4in. hot-water pipes, arranged in coils, each chamber having its distinct hot-water boiler. The air then left the chambers and passed to a secondary series of passages in direct communication with the rooms, through vertical shafts formed in the thickness of the walls. The air, after its circulation over the different spaces, was carried away by a third series of shafts formed in the roofs, in communication with the main extractor, situated at the east, south-east, and south-west angles of the building. The heating surface distributed over the building was about 20,760 square feet. The cubic space to be warmed, including the amount of air necessary for ventilation supplied by the fan, was about 3,800,000 cubic feet, and the average consumption of fuel daily was 2 tons 3 cwt. for a difference of 125° Fahr. between the temperature of the pipes and the spaces to be warmed. The volume of air supplied per hour to the building was 1,800,000 cubic feet. The cost of the annual maintenance of the apparatus was about £500.

Mr. W. H. Lascelles has just received the Cross of Chevalier of the Legion of Honour by post from Paris, with a note, signed by M. Waddington, informing him it is for his exhibits in Classes 17, 66, and 85 in the late Exhibition.

The parish church of St. George the Martyr, Southwark, was reopened, on Thursday week, after the execution of internal repairs and decorations carried out by Mr. W. J. Cloake, of Union-street, Borough. The *South London Press* is responsible for the statement that the contractor "received no elaborate instructions with his order: he was merely told to make the best he could of the work."

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OUR LITHOGRAPHIC ILLUSTRATIONS.

CONDEMNED CITY CHURCHES.

St. Margaret Pattens.—This church had an existence as early as 1324, and owes its name—so Stow, in his "Survey of London," informs us—to the fact that "of old time pattens were usually made there and sold." The present edifice was built by Wren in 1687. The west front and tower are of stone; the south front (towards Eastcheap) is stucco, with stone quoins. This steeple is one of the tallest in London, being 198ft. in height. *St. Mary Abchurch.*—The origin of the name and date of foundation of this church are lost in obscurity, but it certainly was in existence in 1363. After the Great Fire it was rebuilt by Wren in 1686, and is of red brick with stone dressings. It has a fine carved altar-piece by Grinling Gibbons, and was painted in a natural manner by Sir James Thornhill; in a later age it was painted white, and afterwards grained to match the other woodwork! *St. Stephen,* Coleman-street, was founded in the latter part of the 12th century, and shared the fate of so many others in the Fire, and was rebuilt in 1676. The east end, shown in sketch, has been considerably altered since Wren's time, but certainly not improved. It is described in "Parentalia" as "adorned with a cornice and circular pediment between two pine apples," &c., and is so shown in an old print in the Guildhall Library. This alteration was probably made about 1827, when some galleries were placed in the church. The drawings of these churches have been made from sketches taken on the spot by Mr. Robert Kendrick, of Warrington, and Mr. Jesse F. Scott, Stamford-hill, London.

ST. MARY'S OWER, BIRNAM.

ST. MARY'S TOWER, Birnam, near Dunkeld, is the property of the Right Hon. Lord John Manners, M.P., H.M. Postmaster-General. We have received no description of the building.

A CONVALESCENT HOSPITAL.

OUR double-page illustration this week is from the drawing exhibited this year at the Royal Academy Exhibition by Mr. P. J. Marvin. The design was submitted in competition early in the year for the R.I.B.A. Soane Medallion, and our remarks upon this and the other designs submitted will be found in the BUILDING NEWS for March 22nd last. We also published the selected design in our issue for April 26th. Mr. Marvin's drawings certainly ran the selected plans very hard in the competition, and our readers will now be enabled to compare the two designs. The total length of the entrance front of Mr. Marvin's design is 185ft. 6in., exclusive of the projecting bays.

TRURO CATHEDRAL.

OUR illustration gives a view of the sketch design, which, along with drawings of other work, was submitted to the cathedral committee by Mr. J. M. Brydon, of 98, Gower-street, W.C. The site being somewhat limited—240ft. long by a width of only 72ft.—seemed to require some special arrangement to secure the requisite area in the plan. The idea of a central lantern (after the manner of Ely) was adopted, and the plan and view show how it was carried out so as to become the central feature of the design. The advantages of such a treatment for a confined site are very great, when the congregational requirements of a modern cathedral are taken into account, as compared with one designed for the elaborate ritual of the middle ages. To save area space the vestries were also included within the building, and the chapter-house is placed on the north side, on ground the committee hope to be able to acquire at a future date. The general dimensions are:—Nave, 100ft. by 28ft.; choir 70ft. by 28ft.; central lantern, 50ft. diameter (exclusive of the shallow double transepts); the general height of the vaulting, 60ft.; the west towers about 200ft.: and the central hexagon, 250ft. The design was for an entirely new building, irrespective of the old church now on the site, and is founded on late 14th-century English Gothic.

JOINERY DETAILS—"BUILDING NEWS" DESIGNING CLUB.

THIS sheet is a reproduction of the designs submitted by "Motto J." for the joinery details of a detached villa residence to cost about £1,500. The drawings will speak for themselves, and we have already given our opinion upon them. The whole of the work is intended "to be executed in red deal painted green." The designs were selected by us for the first place in the competition.

COMPETITIONS.

CARMARTHEN.—Thirty designs were sent in from architects in competition for the lych-gate to be erected in St. Peter's churchyard, Carmarthen, in memory of the Rev. L. M. Jones, B.D. After a careful examination the committee have selected the design bearing the motto "Fac et Spera," sent in by Mr. Francis E. Jones, architect, of Notting-hill, London. The design placed second is that bearing the motto "Spes," by Mr. J. M. Brooks, of the Grange, Stoke Newington.

COCOA HOTEL AT BLAENAN FESTINIOG, NORTH WALES.—Fifteen sets of designs had been received in the competition for a cocoa hotel proposed to be built at Blaenan Festiniog. The decision of the board of directors is as follows:—First, designs by E. Jenkin Jones, architect, London; second, designs by J. Humphreys Jones, architect, Mold; third, designs by Mr. Walker, architect, Liverpool.

LANCASTER.—In August last the Lancaster King's Arms and Royal Hotel Company, Limited, having acquired the present old King's Arms Hotel and other extensive properties, advertised, offering prizes and inviting architects to send in designs for rebuilding the hotel on a more modern and extensive scale, and for laying out the rest of the estate to the greatest advantage. In response nineteen architects sent in designs, including one set from France, and after much consideration the prizes have been this week awarded as follows:—First prize, the carrying out of the work, to Messrs. Holtom and Connon, architects, Leeds; second prize of £30 to Mr. Stephen Shaw, architect, Kendal; and third prize of £20 to Messrs. Hetherington and Oliver, architects, Carlisle. The amount proposed to be expended upon the hotel portion is £6,000. Mr. Austin, of the firm of Paley and Austin, was the architect called in to assist in adjudging the designs.

OVER DARWEN.—We are informed that the Town Council of Over Darwen have not yet prepared their instructions to architects for the forthcoming competition for the new town hall and market buildings.

ROSS COTTAGE HOSPITAL.—A meeting of the governors was held on Wednesday week at the Dispensary, Ross, Herefordshire, and out of 16 designs sent in for a new hospital placed those bearing the motto "Well Considered" first, "Thorough" second, and "Light and Air" third. On opening the sealed envelopes the authors were found to be those placed—first, Messrs. Haddon Brothers, of Hereford and Malvern; second, Mr. Gordon Lennox, of Camberwell; and third, Mr. Pritchett, of Darlington. The acceptance of "Well Considered" is conditionally that the required works can be carried out for the stipulated sum of £1,200.

SCHOOLS OF ART.

CARLISLE.—At the twenty-fourth annual meeting of this school of art a report was read, showing that the high standard of efficiency has been well maintained by the head-master. 180 students had joined this year—an increase of 13. Two third-grade and 11 second-grade prizes were obtained in the Government examination, besides several passes, &c. The bronze medal in the National competition had been awarded to Miss Lucy Atkinson, a student of the morning class, for a painting in sepia from the antique cast of the Theseus. Amongst the local prizes was one for a carpet design, for which there was a spirited competition; it was won by Mr. Armstrong.

CITY AND SPITALFIELDS.—The annual meeting and distribution of prizes took place in the school hall, Skinner-street, on Friday night. The report, after referring to the services rendered to the school by the late Mr. Purdy, stated that permission had been obtained for the students to visit the black and white exhibition and the gallery of the Society of Painters in Water Colours. Permission was also given by the rector of St. Bartholomew the Great for students to make drawings in the church in order to compete for a prize for the best study made there. The Norman architecture still remaining in this church is too little known, and perhaps, because so close at hand, little sought after and admired, and it was thought a fair opportunity for inducing students to observe details of a building which formed part of an ancient priory founded at the very commencement of the 12th century. The Baroness Rothschild's prize this year was offered for table ornaments. The Painters' Company offered two medals (silver and bronze) for designs for wall decorations. Mr. Hill's prize was given for a design for book cover—the design to be entitled "The Progress of Civilization." In compliance with a resolution passed at a Court of the Joiners' Company, that respect should be had to those pupils following the trade of joiners and ceilers, a prize was offered for an ornamental balustrade. The competition for Mr. Norris's prize was limited to those under 18 years of age, and the committee offered a prize specially to beginners. The Clothworkers' Company still assist the school in its work of education, and the companies of Weavers, Joiners, and Painters continue their support.

EARLESTOWN INSTITUTE, WARRINGTON.—The second annual presentation of science and art prizes took place on Wednesday week. The report as to art subjects was that they had not been so successful as in the previous year—seven passed out of 33 sent up to the Government examinations. The results in the science classes were more encouraging—55 passed out of 80 who entered.

A considerable opinion prevailing that a life-long honest endeavour on the part of Mr. Ruskin to further the cause of art should not be crowned by his being cast in costs to the amount of several hundreds of pounds, the Fine Art Society have agreed to set on foot a subscription to defray his expenses arising out of the late action.

The Town Hall at Sittingbourne was reopened, on Tuesday week, after restoration and improvement from the plans of Mr. W. L. Grant, architect. On the same occasion a portrait of Mr. George Smeed, painted by public subscription, by Mr. Edis, was unveiled.

Mr. Trevail has been appointed architect of the new Corn Exchange about to be built at Truro, at a cost of £2,000.

The Town Commissioners of Newtownards have appointed a committee to inquire as to the relative merits of three alternative schemes for the supply of water to the southern district of the town, prepared by Mr. Henry Chappell.

The Rural Sanitary Authority of the Wolstanton and Burslem Union having applied to the Local Government Board for sanction to borrow £6,000 for works of water supply for the special drainage district of Thursfield, Mr. J. T. Harrison, C.E., held an inquiry on behalf of the Local Government Board on Thursday week.

The sixth annual exhibition of the Glasgow Art Club is now open. The *Glasgow Herald* remarks that the paintings in oil and colour are all modest in size this year, and that the lower prices exhibit a marvellous decadence in the value of genius as appraised by members of the club.

View from the Opposite Bank of the Tay

Plans of St Marys Tower

Upper Floor

Ground Floor

St Marys Tower at BIRNAM near DUNKELD The property of the Right Hon Lord John Manners

John Carver Architect

MEIGLE and FORFARSHIRE

Photo Lithographed & Printed by Jas Akers 6 Queen Square W C

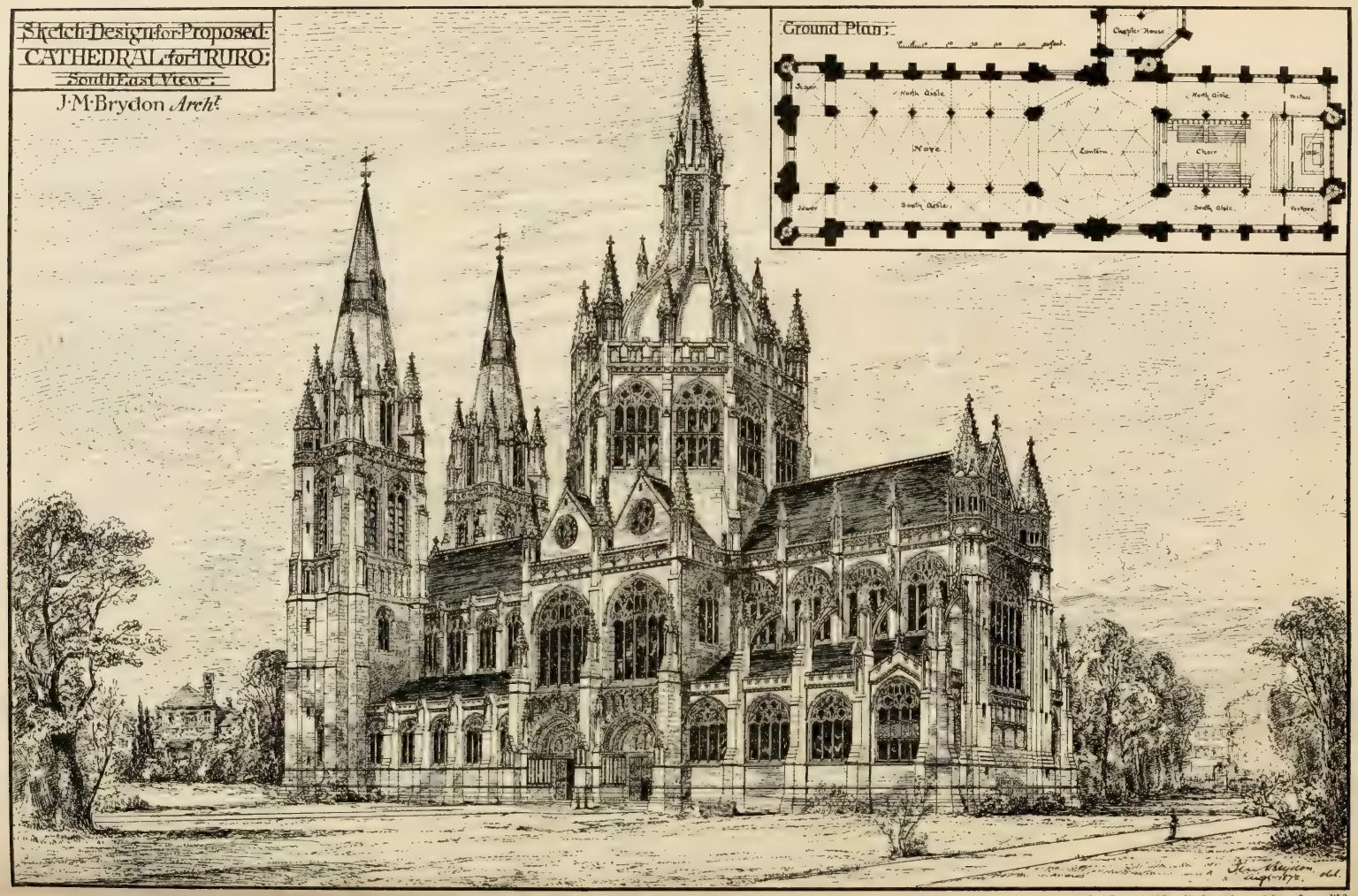
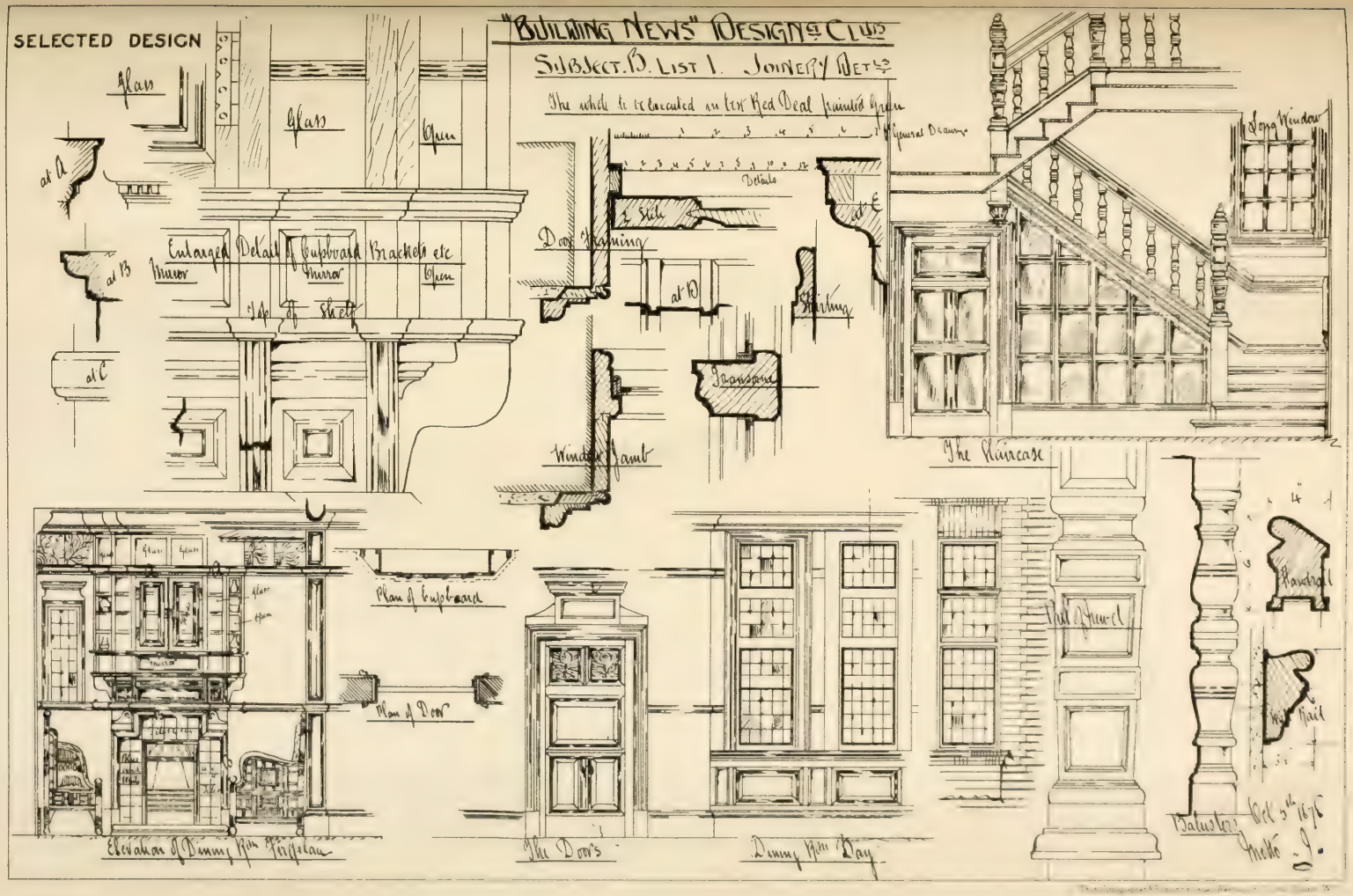


Photo Lithographed & Printed by James Akerman, 6 Queen Square, W.C.

Condemned Churches in the City


SELECTED DESIGN
"BUILDING NEWS" DESIGNS CLUB
SUBSECT. B. LIST I. JOINERY, ETC.
The whole to be executed in best Red Deal finished Green
Figured Drawing
Details
Glass
Glass
Open
at A
at B
at C
Enlarged Detail of Cupboard Brackets etc
Mirror
Mirror
Open
Lap of Sheets
Door Framing
Sill
at D
at E
Skirting
Transom
Window Jamb
Long Window
The Staircase
Plan of Cupboard
Plan of Door
Elevation of Dining Rm Fireplace
The Doors
Dining Rm Bay
Newel
Handrail
Rail
Balusters
Oct 5th 1878
Archt

THE ROOFING CONTROVERSY AT ST. ALBAN'S.

THE opening meeting of the winter session of the Society of Antiquaries was held on Thursday evening, and was devoted to a discussion of the desirability or otherwise of the proposal to place a high-pitched roof on the nave of St. Alban's Cathedral. Dr. Smith occupied the chair in the absence of the president, the Earl of Carnarvon, who wrote explaining the circumstances under which he had protested to the St. Alban's restoration committee against the proposed new roof. Since taking this step he had found he was acting in conformity with the views of the late Sir Gilbert Scott and his son, Mr. John Oldrid Scott, the past and present architects, both of whom had suggested measures for the reparation of the roof, and he therefore had some difficulty in understanding the resolution of the committee, passed on August 10th, by which it was resolved to restore the nave roof to the original pitch indicated by the weathering on the tower, because it had become ruinous. He would commend to the fellows' consideration the "curious discrepancy between the resolution of the committee and the report of the architect, and would leave it to others to furnish the explanation it seemed to demand, and to draw the inferences it seemed to suggest."

Mr. James Neale read a paper descriptive of the present condition of the nave roof, illustrated by a series of large measured drawings and sections. Commencing with the general dimensions, he said the distance from the west wall of the great central tower to the east jamb of the great west window is 280ft., and the distance between the north and south parapets of the nave is 43ft. The pitch of the roof is about 18°. The net area of the finished surfaces of the leadwork is about 12,700 superficial feet or 1,411 superficial yards—that is more than ¼ of an acre. The lead covering is in fair condition on the whole. In each of the nine bays, comprising a distance of 200ft. from the west end, there is a tie-beam opposite the centre of each main pier, and an intermediate tie-beam between each of these—19 in all. In the other four bays of nave—the eastern ones—the principals are less systematically placed and are more frequent. There are, indeed, three principals in the next bay but one to the tower. The four bays have 13 principals, making a total for the nave roof of 32 principals. At the east end these principals are not above 5ft. 5in. apart; in the western portion of the Decorated bays 8ft. 10¾in., and in the Early English bays 9ft. 10in. This spacing is not a mere eccentricity; it naturally follows the spacing of the architecture beneath. The construction of the principals is extremely simple. The span between walls is about 33ft. The height from under side of tie-beam to upper side of ridge piece is 6ft. 2in., giving a pitch for principal rafters of 18°. In the western portion of the roof the oak tie-beams bear from 15in. to 21in. on the walls, where they are about 13½in. in depth by 12in. in width. This depth is increased to 16in. in the centre of the bearing. The beams do not appear to be cambered, the ceiling boarding being practically horizontal. At the tie-beams are huge cast-iron plates, 13in. deep, of metal 1 1-16in. thick; now that the south wall has been straightened these project in the oddest fashion in front of the finished ashlar facing. The principal rafters average 6in. deep by 7in. wide; they abut in the centre of the span of the roof against the sides of a post 11in. square, which is tenoned into the tie-beam, and receives the longitudinal ridge-pieces in mortices cut into the eastern and western sides. These ridge-pieces are cut out of stuff 6in. deep by 9in. wide. The centres of the purlins are 5ft. 8in. from the internal face of the walls; the bearings of the common rafters are thus very fairly divided. These purlins are 6¼in. deep by 8in. wide, and are supported from the tie-beams by short posts cut out of stuff 14in. by 9in. Brackets, 12in. by 14in., on the sides diminish the bearings; there is also a wrought-iron strap on each side of post, attached to tie-beams, and 1¼in. oak pins and heavily-bolted iron shoes connect the timbers together. The common rafters in the western portion are 6in. by 7in., some few 5in. by 6in., and are placed 1ft. to 14in. apart. The ceiling joist binders are 8in. by 4½in. and 8in. by 6in., and the ceiling joists 3in. by 3in. and 3in. by 4in. There is throughout the scantlings a marked distinction between the western and eastern parts of the roof, the timbers in about 100ft. of the western portion being inferior in size, number, and condition to those in 180ft. eastward of this portion, reaching as far as the tower. The ceiling boarding from the rood screen to the west end is of the poorest kind, mostly apparently in deal in 9in. widths, and about ⅝in. thick. He might venture to call the decoration "daubing," but it might be an unskilful copy of an earlier ceiling. He thought, however, there is in the roofs sufficient evidence to enable us to conclude that exposed beams and recessed panels, such as those of the present choir ceiling, existed before the present ceiling was formed over the rest of the nave, largely with the old timbers. Perhaps putting back the ceiling panels between the ancient timbers would approach more nearly the accepted ideal of restoration than the complete removal of all the ancient timbers themselves. From these descriptions of the framing, and the scantlings of the timbers of the roof it will be seen that timber has been very liberally used for all important timbers, as also that in principle of construction, though possessing no special scientific merit, the roof does not fall short of much genuine mediæval work. Almost all the timbers are of oak; some of it in very good condition, and likely to last a very long time; some of it decayed or damaged, and needing to be repaired at once. To sum up the whole matter shortly, out of 32 principals (the portion of the roof containing 12 principals has been already repaired) 20 are then left. Suppose we put the thoroughly good principals at four (the lowest number that seems at all likely), 16 are then left. Allow that half of these would be better replaced (an extreme supposition) and eight repaired. It seems an extreme measure to pull down a roof 280ft. long, because 40 to 70ft. might be displaced during the substitution of new timbers in place of the worst of those now existing. The state of the case could not be better put than in a letter of Mr. John Oldrid Scott to the Rev. W. J. Lawrance, dated 25th June, 1878—a letter which was only shown to the author after he had written this paper. Concerning the age of the roof, no strong reason for doubting that that portion over the eastern portion of the nave represents the original roof erected after the completion of the stonework of the decorated bays, about the middle of the 14th century. At St. Alban's, about the year 1350, a low-pitched roof was not a novelty. The roof of the ante-chapel to the Lady chapel, erected about 25 years before, has a pitch of only 21°. The Lady chapel, completed shortly after the ante-chapel, is now covered with a modern roof; but the form of the east wall determines the original pitch, which was 16°. The nave roof, with 18° of pitch, followed these precedents closely. The Norman roof very probably abutted at the level of the inclined grooves on the west face of the tower. The angle was one of 50° both over nave and transepts. With anything like the present arrangement of parapets and gutters no roof abutting against the grooves could have been put over the nave. The mortice holes occur so infrequently and irregularly that nothing can be established by means of them. It may be that the timbers in which the mortices occur formed part of the nave roof, which was removed when the decorated bays were reconstructed. In conclusion, Mr. Neale said he had limited his paper to showing what the existing roof is, what evidences there are of its date, and that it is in itself a piece of history of an interesting kind, which it would be a pity to destroy without good reason. He had also endeavoured to show that there is no good evidence that a high-pitched roof was ever put over the Decorated bays, throughout merely contributing facts required in discussing the subject. For this purpose he had made special visits to St. Alban's, and spent a long time in and on the roof, and had thus supplemented old studies.

Mr. G. E. Street, R.A., said he had been appealed to by both sides in this controversy, but had hitherto come to no opinion on the matter. On Tuesday he, with Messrs. Blomfield and Ewan Christian, visited St. Alban's, and inspected the cathedral roofs. At present, he said, no steps have been taken towards replacing that on the nave, except that the contract has been signed. From the building itself it is probable that the original Norman design was a uniform series of steep-pitched roofs abutting on the central tower, and on the aisles roofs of similar pitch resting on the nave walls. The weatherings of those roofs may be seen, and a vast quantity of timber has been re-used. The present rafters have been cut out of the former ones; they are of great size, 8in. × 6in., and 9in. × 6in. Upon them may be seen mortice holes worked at a given angle, and proving, when these are fitted together, the exact positions of the ties, ashlars, braces, and collars of the high roofs. (Mr. Street exhibited and explained the conjectural restoration in section of the roof framing, reproduced on a reduced scale on p. 579.) In Mr. Neale's drawing of the tower the weathering was a little misplaced; its position, and those of the openings or west face of the tower, showed the height of the tie-beam and collar, and afforded evidence of a flat ceiling below the roof, as at Adel, near Leeds. The absence of parapets during the existence of the high roof is proved by the stringcourse. The north and south choir walls were raised 8ft. or 10ft. to allow for the groining, and the whole eastern portion was designed for flat roofs. The nave and transept roofs were, however, of the same pitch, and if the former be raised it is all the more necessary that the transepts shall correspond. It is difficult to ascertain the date of the present low roofs, as the old ones and the ceilings beneath were shored up while the arcades beneath were reconstructed. The parapets are unfinished, and of so little character as to aid very little in judging. The cornice is not later than 1320, and the arch connecting the nave and north transept exhibits 15th century mouldings. The roof itself is unusually good work, and has been carefully made. The purlins are placed vertically instead of following the roof inclination of late examples. The common rafters are of immense size and solidity. The trussed tie-beams are of a construction used from the 12th to the 15th century. The best part of the roof is that of the nine east bays of nave. He had been consulted as to a somewhat similar roof at South Minns, a few miles south, which was partly built in 1494, and had stained glass added in 1596, and between these dates must be assigned the period of erection of the present roof at St. Alban's. As to the ceilings, he believed they were the original ones, repainted and repaired at intervals from the 11th to the 18th centuries. Many of the eastern panels were probably Norman, but now so rotten that they ought to be treated in the same manner, by backing with canvas, &c., as one would deal with a valuable oil painting. The western ones were modern copies, and so decayed that it would be impossible to replace them were they removed. As to the restoration, he could not see any difficulty in repairing the roof. The four or five eastern bays would need removal; the remainder, if a few new tie beams were introduced, and the work, scarfed, bolted, and braced with iron, would be rendered safe. The present lead ought to be re-rolled, and if the pitch were unaltered it could be replaced. In fact, the greater part was not, in his judgment, in such a state as to make it necessary to remove it. Further than this, the raising of the roof would reduce the apparent height of the tower from 70ft. to 50ft. above the adjoining roof lines, and this and the necessary removal of all parapets would give the abbey a lumpy proportioning, such as they saw at Winchester. The painted ceiling, too, extremely good of its kind, would be destroyed. It seemed that the committee were proceeding with the rebuilding of the western portion of the parapets commenced by Sir Gilbert Scott. They were on the horns of a dilemma: either they must abandon this work to parapets, on which much had been spent, and reinstate the high-pitched roof, which had no parapets, or they must continue the parapets and steep roof, when it would not be a reproduction of anything that could have existed at any one time. The transept roofs would have to follow the same outline.

Further, the roof must be of fir, covered with tiles, slate, lead, or perhaps copper. His experience of modern fir roofs obliged him to protest against the use of this wood. He hoped it was not too late to ask the committee to reconsider their decision.

Mr. A. W. Blomfield confirmed Mr. Street as to the opinions formed in their inspection, adding that in his judgment it would be the greatest possible mistake to remove the present roof, which was capable of being repaired.

Mr. Ewan Christian corroborated. He was nearly certain that the present roof was of the 13th century, but it might be later. The tie-beams were decayed, but the kingposts, purlins, and rafters were capable of repair. It would be a monstrous shame to remove a roof which at no great cost could be repaired so as to last another 200 or 300 years. It would, indeed, be almost impossible to construct the high roof as it ought to be constructed in English oak, judging from the difficulty found in the recent work at Exeter Cathedral.

Mr. William White exhibited a drawing showing a conjectural restoration of the old high-pitched roof junctures at the tower which he had made since a visit that morning. The nave roof was 3ft. 6in. higher than those of the transepts. Part of the corbel table was of thin Roman tiling, re-used in Norman times, and coeval with the walling. The parapet and the steep roof could never have existed contemporaneously. He agreed with the previous speakers as to the inexpediency of removing the present roof.

The Rev. W. J. Lawrance, Vicar of St. Albans, said Mr. J. O. Scott reported on the 10th August in favour of the new roof.

Mr. John Evans, D.C.L., thought that after the report of Mr. J. O. Scott, stating his own and his father's views as to the possibility of repairing the roof, at the dictation of some members of the committee he had turned round and gave his opinion in another direction. He was sorry to say that neither the letter of their president, Earl Carnarvon, nor protests from the British Archæological Association and the Society for the Protection of Ancient Buildings had had any effect on the country committee, and he had himself withdrawn from their meetings. The poor abbey had become a *corpus vile*, on which imaginary experiments in roofing might be tried by newspaper correspondents. He had maintained in opposition to Mr. Scott, that there was no evidence of the existence of a high-pitched roof since the erection of parapets, but such was the ingenuity of modern art that the two were to be combined by a simple system of "drops." They had a certain amount of evidence as to the probable date of the roof, for it was known that in 1323 a great part fell down, doing so much damage that it was not restored for 20 years, and some of the heraldic devices upon the ceiling of the Benedictine choir were about the date 1340. The parapets were not added till about 150 years later, as they were probably built at the same time that Perpendicular windows were opened at the level of the old triforia.

Mr. Charles Barry, P.R.I.B.A., said the question of the necessity or otherwise of a new roof was one which must be decided by experts. He wished that Mr. Scott had been present to have explained the occult influence which had induced him to alter his judgment and personal action. He trusted the committee would not consider it inconsistent with their dignity to reconsider the question.

Mr. Micklethwaite responded to a challenge from the chairman that some one holding opposite views to those already expressed should explain. They had a large amount of valuable painting beneath the roof which had been altered at intervals from the 11th to the 18th centuries, and now was becoming rotten. While the discussion was proceeding the roof itself was out of repair. Now that roof was not by any means beautiful, and an increase of height would improve its appearance. Could this be done without destroying work of historical value? He believed they could do this, and that the ceiling could be preserved although the roof were raised. Sir Gilbert Scott did precisely this at Selby Abbey, where they could see his new high-pitched roof over a 15th century ceiling. If there was any objection to a steep roof the proposal must be combatted on æsthetic grounds; the one thing they were debarred from doing was to replace the roof by a similar one, for it ought to be characteristic of the present time. They were just as much entitled to erect a high-pitched roof in the 19th century as the men of the 14th were to substitute a low for a high roof. The argument applied only to the nave and transepts, where a steep roof could do no harm; in the aisles the case differed, for there a substitution would unjustifiably block up the Perpendicular clerestory lights.

Mr. J. P. Seddon referred to the improvement that would be effected in the long low line of St. Alban's nave by an increase in pitch, and said he thought the change might be made if no injury would accrue therefrom to the ceiling.

Mr. Street said he had nothing serious to reply to. He hoped Messrs. Seddon and Micklethwaite would not have a chance of running a-muck at our old buildings. Their arguments would justify putting glass roofs over our abbeys and cathedrals. What he had tried to show was, that the existing roof could be repaired. The two last speakers had replied that it didn't matter—they could have a new one. But the funds proposed to be applied for this purpose had been raised for restoration—to put the building into its old state. Nothing, he was glad to say, had been actually done yet in the matter—even the timber had not been obtained by the contractor, Mr. Longmire, and it was not yet too late for the committee to reconsider the subject.

Mr. Joseph Clarke moved, and Mr. Millman seconded, a resolution expressing the opinion of the members that the roof of the nave of St. Alban's Cathedral can be rendered perfectly sound and serviceable, and that under the circumstances the proposal to substitute a high-pitched roof is greatly to be deprecated, and opposed to the principles of true construction; and further, thanking Earl Carnarvon for the action he had taken in the matter during the recess.

The first portion of the resolution was passed *nem. con.*, the vote of thanks unanimously, as were also motions of thanks to Messrs. Weale and Street.

THE BUILDING TRADE IN THE WEST OF ENGLAND.

A FEW weeks ago we announced that notice had been given by the master builders of Liverpool to nearly all the branches of workmen in the trade of 1d. per hour reduction in the rate of wages in consequence of the unusual depression of trade in that city, and the probability of its continuance for some time to come. The movement there has led to the consideration of the matter of wages in the large towns, and at a meeting of the National Association of Builders last week the general feeling of the country seemed to be that the time was come for a universal reduction in the scale of pay. Accordingly the Master Builders' Association of Bristol has taken up the question, and after having fully discussed it, has unanimously resolved to give notice of a decrease of ½d. per hour in the rate of all skilled artisans, other *employés* in the trade being lowered *pro rata*, the alteration to commence on the 1st of June next. This notice is rendered necessary by the rules between the association and the operatives, arranged some time ago. Wages in the West of England have been for some time lower than in the North, and this is the reason why the decrease is not so great as at Liverpool. All branches of the trade in Bristol work 54 hours a week in summer, and 48 in winter, their old rate of pay being as follows:—Bricklayers, masons, and plumbers, 8d. per hour; carpenters and joiners, slaters and plasterers, 7½d.; and painters, 6¾d. to 7½d. The notice does not affect the labourers, whose maximum pay was fixed some time ago at 4¾d. per hour. The notice of the reduction was posted on Saturday morning last in nearly all the workshops of the city, and it was also announced that there was to be a revision of all the existing rules with the men.

New Unitarian schoolrooms in York were opened on Monday. The architects of the building were Messrs. Gould and Fisher, of York; and the contractors Messrs. J. and G. Walker, builders.

ARCHITECTURAL SOCIETIES.

Leeds Architectural Association.—This association held its annual conversazione on Tuesday evening. One of the finest collections of works of art which has been seen in Leeds for some time past was presented for the inspection of the company. The president of the association, Mr. Alexander Crawford, in the course of the evening told the company what were the objects of the society, which aimed at combining, as far as it was able, the objects of both the London representative societies: it desired to consolidate the profession in Leeds, and to introduce more systematic rules of practice. It also wished to let the public become better acquainted with the duties that devolved upon architects. Further, it followed more particularly the association in trying to make itself an educational body. The prizes were then presented. Those offered by Mr. Chorley for designs for a detached suburban villa were awarded (1st) to Mr. R. Lowish, and (2nd) to Mr. J. Jackson. For a drawing of the human figure from the round Mr. W. Riley was presented with a prize. The fortunate competitors in producing sets of sketches at the fortnightly class meetings (prizes for which were offered by Mr. Fraser) were 1st, Mr. J. Jackson; 2nd, Mr. W. Riley; and 3rd, Mr. F. Haigh. The prize offered by Mr. Franks for the best designs of a small house with timber frame and plastered gables were won (1st) by Mr. W. Riley, (2nd) by Mr. G. Stephenson. The silver medal of the association was presented to Mr. B. P. Shires as the owner of the best series of measured and figure drawings from examples prior to 1750, which includes many delineations of Thornton Abbey, Lincolnshire, illustrated by us July 19, 1878; also Markenfield Hall, one of the drawings which received an extra prize at the R. I. B. A. this year, and which was also illustrated by us, May 10, 1878.

The Dean of Durham appeals in the *Times*—as a last resource, we suppose—on behalf of the Weavers' Tower at Newcastle-on-Tyne, which, in spite of strenuous local efforts and the remonstrances of archæologists in all parts of the county, the Newcastle Town Council have determined to demolish, because it would be "an excrescence in the front of a modern building."

On Saturday the new cemetery at Chapeltown was consecrated. The mortuary chapels are in the Early English style. The whole cemetery occupies about four acres and a half, and the total cost of land and buildings, and laying out, is £4,000. Mr. Walter J. Sykes, of Holyland, near Barnsley, designed the buildings, &c., and has superintended the carrying out of the works.

The professors of Queen's College, Cork, resolved last week to erect a memorial to the late Professor Harkness, in the form of a stained glass window in the examination hall of the college.

It is proposed to build a new bridge over Faversham Creek, from the designs of Mr. Easton, at an estimated cost of £4,500.

In our issue of the 22nd ult. appeared a notice of the opening dinner of the new Royal Oak Hotel, Kirtley, South Lowestoft. It was therein stated that the builders were the Messrs. Lucas Brothers. The sole contractors for the works, we are now informed, were the Messrs. Swatman Brothers, of Lowestoft.

The annual meeting of the Shropshire Archæological and Natural History Society was held at Shrewsbury last week. The report showed that the year had been a useful and successful one. The members of the council were re-elected, and it was decided to take measures to render the society's museum in Shrewsbury of more general advantage and interest.

On Thursday week the new Episcopal church, which has been erected in Union-street, Greenock, on the site of the old building, was consecrated. The building is in the Early English style. The nave is 73ft. long, 26ft. wide, and 58ft. high, and the chancel is 37ft. long and 56ft. high. The north and south aisles are 17ft. wide. The total width of the church is about 51ft., length 110ft., and the tower is 140ft. high. The church will accommodate about 600 persons, and will cost about £10,000.

A memorial window to Dr. Livingstone is about to be erected at Westminster Abbey. The commission is in the hands of Mr. Dixon, of Sheffield.

It has been decided to build a memorial church at Plumstead, on a site overlooking the spot where the Princess Alice was lost; and also to erect a national memorial on Plumstead-common, opposite Tripcock Point as a warning to navigators and as a landmark. Between £2,000 and £3,000 has been subscribed.

Building Intelligence.

ABERDEEN.—On the evening of the 9th October, 1874, one of the greatest conflagrations that had taken place in Aberdeen for many years completely demolished the quaint old spire of St. Nicholas, and left the walls of the tower and of the East Parish Church black and bare. The restoration of the church was soon begun, and in about a year and a half after the fire the building was reopened for divine service. The contracts for the restoring of the spire were signed in August last year, and the masonry of a massive handsome granite spire has just been finished. The new tower, where it is seen above the roofs, is about 28ft. square over, or the same size as the old tower, and is flanked at each corner by octagonal piers. These piers, above the cornice, are panelled, and terminate in crocketed pinnacles, while flying buttresses spring from them to the spire. There are two large belfry windows, with freestone mullions and traceried tops on each face of the tower between the octagonal piers. The clock gables, which rise on each face of the tower, are crocketed, and have ornamental crosses or finials on the top. The diameter of the clock dials will be about 7½ft. The spire, which springs from the level of the top of the cornice, is finished by a handsome finial, carrying at a height of about 198ft. from the ground the weathercock which was saved from the old spire. The spire is octagonal in form, and on its angle, against which the four flying buttresses and the four clock gables abut, rise eight square pinnacles, with a connecting-panelled parapet between them. Triangular gablets and crosslet openings relieve the upper part of the spire, and give light to the various floors into which it is divided. The design was drawn by Mr. William Smith, architect, Aberdeen. Exclusve of the clock and bells (if these should be supplied), the cost to the town will be about £8,500.

HUMBER.—The parish church of Humber, near Leominster, was re-opened on Thursday, the 28th ult., after restoration of the nave and tower. The work has been carried out from the designs of Mr. T. H. Wyatt, of London, who was also the architect for the restoration of chancel carried out two years previously; and Mr. J. Davies, builder, Leominster, was again the contractor. The alteration just completed included the taking down of the north side of the nave and rebuilding. A transept has been added on the north side. A part of the west wall has been rebuilt. The porch, also restored, consists of an old oak frame replaced. The lights are all considerably enlarged, and put in with cathedral glass and American stained lancet windows. A vestry has been formed out of the old belfry, with a floor of encaustic tiles. The whole of the nave was also laid with encaustic tiles, supplied by Messrs. Godwin, Lugwardine. In the place of the high-backed pews there are open pitch-pine seats with ornamental ends. The old font has been re-fixed with new plinths underneath and the old pulpit is re-fixed for the present. A new open roof has been placed over the nave of stained pitch pine, and the cornice moulding is also of pitch pine. The new stone is from the quarry of Mr. C. Scarlett, Luston, Ludlow.

METROPOLITAN BOARD OF WORKS.—At this board on Friday an invitation for the officers of the board to inspect Scott's Sewage Works, at Burnley, was declined, after a discussion on sewage disposal, in which Mr. Runtz insinuated that the agitation against the board's discharge of sewage into the river might be promoted by persons having an interest in schemes of utilisation, or with disinfectants to dispose of—a charge received with applause. Mr. J. H. Kidd was informed that in the opinion of the board his system of removing and drying the solid matter contained in sewage could not be used with advantage in the metropolis. In consequence of complaints from inhabitants of Kilburn and Hampstead, as to the deficient size of the main sewers into which their local sewers discharge, the matter has been referred to the works committee, and on their recommendation it was decided that the main sewers from Granville-road to Alexandra-road, and from Alexandra-road to West-end-lane, be deepened and enlarged to 7ft. and 5ft. in diameter respectively. £3,077 was voted towards the cost (£6,154 11s. 7d.) incurred by Kensington vestry in reconstructing and widening the bridges carrying the Ladbroke-grove-road and Golborne-road over the Great Western Railway. The board resolved to promote as a private measure, in the ensuing session of Parliament, a bill for the prevention of floods from the river Thames, framed upon similar principles to the bill of last session, which sought to make the riparian owners responsible for the cost of the works. They also decided upon strengthening the Fire Brigade in the City by the addition of twelve men, and to place a moveable station, resembling a tramcar, in Ludgate-circus at night.

SOUTH SHIELDS.—An extension of the Board of Trade premises at South Shields has just been completed. In the early part of 1877, the Town Council invited architects to send in competitive plans, and after a close contest those sent in by Mr. J. H. Morton, King-street, South Shields, were selected, and in October, the same year, the contract to execute the requisite work was let to Mr. Storar, builder, Jarrow, for a sum of little under £2,500, including the fittings of the various offices. The original frontage measured 52ft. in length, to which has been added a length of 86ft., inclusive of an open court. The old elevation, and style and architecture, as designed by the late Mr. Clemence, have been strictly adhered to by Mr. Morton.

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TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.]

All letters should be addressed to the EDITOR, 31, TAVISTOCK-STREET, COVENT-GARDEN, W.C.

TO OUR READERS.—We shall feel obliged to any of our readers who will favour us with brief notes of works contemplated or in progress in the provinces.

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RECEIVED.—S. and S.—F. W. R. and Co.—H. G.—J. B.—J. B. and Co.—J. W. and Co.—H. and Co.—C. G. R.—J. and W.—E. L.

ARCHITECTUS. (Attend a school of art, join the BUILDING NEWS Designing Club, and work hard.)

"BUILDING NEWS" DESIGNING CLUB.

R. LANE, ALFRED BROAD. (The full particulars of this club, and the conditions, were published in the BUILDING NEWS of September 20 last.)—HENRY T. COLEMAN. (Particulars of next subject will appear in due course.)—C. F. W. (Try your hand at the club. Several of the designs are from very elementary students.)

OUR COMMONPLACE COLUMN.

C. F. W. (Be as brief as possible in your notes, and give the substance, not the words, of the authorities you quote from.)

Correspondence.

THE PRESIDENT OF THE R.I.B.A. AND ARCHITECTURAL COMPETITION.

To the Editor of the BUILDING NEWS.

SIR,—I must ask you to give a space in your columns for the purpose of expressing myself on the above subject, and this I do with confidence after the very excellent article which appeared in your last issue, on and together with the report of the P.R.I.B.A.'s address. I write in the interests of the class to which I belong—viz., the younger members of the profession, and those who have not had the good fortune to succeed to a lucrative and high-class practice. In the article referred to you advocate the claims of the class which I write to represent, in opposition to the opinion expressed by the P.R.I.B.A., and for this I give you my best thanks.

Now to the direct purpose of my letter. Mr. Barry was very strong in the condemnation of competitions—"An open competition was the worst course possible," and "a limited competition only less bad;" and "in his opinion the best course was to choose a man rather than a plan." With all due respect to Mr. Barry, I cannot help thinking that this attempt to stamp out the system of competition is altogether unfair to the less fortunate and younger members of the profession. What chance has a man of the class to which I refer of making a name, or even, in many cases, a living, unless through the aid of public competition? It is all very well to talk of the "young and zealous architects who would really gain, if they could only think so, by doing patient and quiet and even unknown good works." I ask you, sir, is this a practical theory? Unknown indeed (even to himself) would be the works that come to a young architect without influential friends! Will "patience and quiet" bring present bread and cheese? Mr. President would lead us to think that all members of this profession were without bodily wants, or were born with the proverbial "spoon in their mouth," and that their sole end and aim was "glory."

But are competitions so essentially bad? I hold with you, Mr. Editor, that competition, if properly conducted, is a fair and proper means of getting the best result for the public good, and I consider that it is calculated to bring out a man's greatest powers, always supposing that the decision is made by competent and unbiassed judges. This latter condition should be insisted on, and fortunately architects have the power, by combination, to resist any attempt on the part of the public to lower their position. Why should the "young and zealous" architect be kept back in obscurity for the sole benefit of those members of the profession who are already fairly established on a ofty pedestal of fame and fortune, to which they have climbed, for the most part, by the competition ladder? Yes, nine out of ten of these champions have "won their spurs" through public competition, and is it fair that they should attempt to take from their less fortunate brethren the means by which they have attained to such eminence? You, Mr. Editor, I am glad to say, have expressed yourself to the contrary.

My sole object is to help to preserve a system, which I think to many is the only hope for future success.

In conclusion, with your permission, I will briefly quote from an address by Mr. Thomas Worthington, president to the Manchester Architectural Association. Speaking on this subject, and failing to find a substitute for competition, he says: "You may ask how is a student, when he has thoroughly qualified himself by application and industry, to commence practice? Is he simply to hang out a sign and sit and wait for work to come? Few men, I fear, are fitted for such an exercise of patience, and it would probably not be long before the young practitioner who made no greater effort than this would, after a short-lived struggle, go to the wall."—I am, &c.,

JOHN BROOKE.

24, Barton-arcade, Manchester, Nov. 28.

THE R.I.B.A. AND THE MEMORIAL TO SIR GILBERT SCOTT, PAST PRESIDENT.

Sir,—The scarcely magnanimous action of the Council of the Royal Institute of British Architects with reference to the memorial of their late President, Sir Gilbert Scott, seems certainly worthy of record. The contrast between the fine speeches and elegant language used at the special meeting called for that purpose by the same council on the occasion of Sir Gilbert's death, and their present treatment of his memorial, is unique. Application was made to the Secretary of the R.I.B.A. to allow copies of the last list of subscriptions to the Scott memorial to be sent out, with the transactions of the Institute, to its members, and for this purpose the lists were printed on one sheet of very thin paper to the right size, so that no expense whatever would be incurred by the Institute. The application was refused; but, at the same time, an offer was made to insert the said lists for the sum of £4. At a meeting of the Scott Memorial Committee held last week the matter was brought before them (the two vice-presidents of the Institute, Mr. G. E. Street, R.A., and Prof. Lewis, being present), and I was instructed to address another application to the Institute, as it was thought the former refusal must have been informally made. To-day, however, I have received an official reply to the effect that "the request of the Scott Memorial Committee was laid before the Council of the Institute on Monday, and they regret their inability to comply," as "they do not feel justified in giving the official sanction to the circulation, with the Institute publications, of an appeal for funds to the memorial of the late Sir Gilbert Scott." The memorial consists in the erection of a brass over the grave in Westminster Abbey, for which Mr. G. E. Street has given a most appropriate and beautiful design, and with the remaining funds the endowment of a technical teachership for art workmen at the Royal Architectural Museum. For these purposes about £900 has already been subscribed. It may be that the Institute's refusal to help forward the memorial to their late President will do more to further the matter than the consent which they have elected to withhold.—I am, &c.,

Maurice B. Adams,
Hon. Sec., Scott Memorial Committee.

Dec. 5, 1878.

THE SO-CALLED 12TH CENTURY WINDOW AT LINCOLN.

Sir,—Having read the precentor's letter in your issue of the 29th Nov., I paid another visit to the old house. The doorway is at the bottom of the winding staircase leading from entrance to basement. The date, 1107, on the under side of the head has been cut a good many years, the surface being coated with dust, grime, and cobwebs, the accumulation of years—perhaps centuries. The other (described as 11 or 15 is more like 1011) has not been altered or tampered with. It is very rudely cut on a rough face.

A few days ago a gentleman called and took a squeeze from it in clay, the mark being still visible. I notice the top step of stairs was wider than the others, that it was in two widths, and that a rude representation of a double cross was sunk on its face.—I am, &c.,

Geo. Bacon.

Norman-street, Lincoln, Dec. 2.

Mr. Edmund B. Ferrey, in a letter in the *Guardian* of this week, writes:—

"In the course of the interesting letter (in your last issue) on the House of Aaron the Jew at Lincoln, Canon Venables refers to too easy credence in early inscriptions in architectural works. He says 'no instance of a date in Arabic numerals on a building is met with before the fifteenth century.' Now, in the west front of Wells Cathedral (which certainly is not later than the middle of the thirteenth century), the sixty subjects representing the Last Resurrection are each numbered with Arabic figures, which have been well considered as a guide for fixing the sculptures in position. During the recent restoration of the west front there were ample opportunities of examining these curious sculptures and inscriptions from the scaffolding. As the work is placed at a considerable elevation from the ground, it is most unlikely that the Arabic numerals would have been inscribed *after* the erection of the façade, and even if so, *cui bono?* These sculptures are undoubtedly contemporaneous with the architecture, though some of the statues above the Resurrection tier were inserted at a later date, as is sufficiently shown by their character. The numerals were obviously much more useful *before* than *after* the subjects were fixed. I venture, therefore, to consider that there is very strong evidence of Arabic numerals having been introduced into buildings at a much earlier date than Canon Venables has supposed."

EARLY DATES ON BUILDINGS.

Sir,—A friend has called my attention to the Rev. Edmund Venables' letter in your issue of 29th November. As he mentions the arms of Bishop Langton and a date of 1493 are inserted in the episcopal dwelling of the Bishops of Winchester at Waltham, it may be interesting to your readers to know that the arms of the same bishop—a cross charged with five roses, on the top of which is a mitre with Laus tibi Xte., a date 1495 in the centre, and T. Langto Winto. underneath—occurs on the outside of the exchequer or gateway of the inner ballium of Taunton Castle, and the same arms, with a date 1498, are still to be seen in the building once known as the porter's lodge, or entrance to the castle green. The latter were removed from an adjoining building at the beginning of the present century, when the upper part of the gateway was in ruins, and inserted in the modern construction. The gateway is probably of the time of Edward III., and a very massive structure. I trust this explanation will serve as a warning to those who are frequently too ready to be guided by misleading insertions with whose history they are unacquainted.—I am, &c.,

Taunton, Dec. 2, 1878. Edwin Slopee.

P.S.—I may have added that Taunton was one of the manors of the Bishops of Winchester for a period of 1,100 years; that the keep of the castle, built in 1138 by Henry of Blois, is still in good preservation, and it is now the home and property of the Somersetshire Archæological Society, who own in addition the surrounding buildings and a good portion of the land adjacent.

IRON ROOF CONSTRUCTION.

Sir,—In the Building News of the 22nd ult. there is a misprint in your report of my paper read before the Leeds Architectural Association.

The tubes forming the compression members of the Amsterdam Station roof trusses are 8in., not 8ft., diameter. The error is so plain to any one acquainted with roof construction that I did not think it necessary for me to trouble you with a correction; but as there is a very uncourteous letter from a correspondent in your issue of the 29th ult., denying the accuracy of the other dimensions, but without correcting anything, I may state that the span (120ft.) and rise (30ft.) are correct, as can be proved by a reference to "Works in Iron," p. 269, the author of which is a partner in the firm (Messrs. Handyside and Co., Derby) who made the roof. The particulars of this and another roof given in my paper were taken, with due acknowledgment, from the work referred to.—I am, &c.,

Thos. Gillott.

Farnley, near Leeds, December 2, 1878.

Sir,—I think Mr. E. Price rather severe in his remarks, vide 574 ante. The cast-iron tube "8ft." diameter, is evidently a printer's error; it should be "8in.," and the rise of 30ft. can easily be understood by description below. Mr. Price knowing all about this roof, why did he not give your readers the benefit of his knowledge? Perhaps you will kindly allow me the privilege of doing so?

Dutch Rhenish Railway.—Amsterdam Station.—The principals may be termed bowstring trusses, placed 25ft. apart c. to c., the arch or main compression member being of cast iron, and the tie-bars and diagonals wrought iron. They are 120ft. span from c. to c. of shoes at springing. The rise of the cast-iron arch is 30ft., and the rise of the tie-bars 17ft., measured from springing line, giving a depth of truss 13ft. in the centre. The word arch is used in describing the compression member of the principals, but it is in fact, polygonal, being composed of straight lengths of cast-iron tubes, 8in. diameter, and angular connecting pieces. The abutting ends of the tubes and connecting pieces are turned and connected together at each joint by four bolts, $1\frac{1}{4}$in. diameter. The thickness of the tubes at springing is $\frac{11}{16}$in., diminishing to $\frac{9}{16}$in. at the centre.—I am, &c.,

Member C. and M. E. Society.

7, Westminster Chambers.

"AMERICAN CRITICISM."

Sir,—In regard to a recent London letter in *The American Architect and Building News*, republished in your issue of 29th Nov., Mr. Burges' letter thereon, and the question of the editor of the provincial journal referred to, Who is the English correspondent of *The American Architect?* perhaps you will allow me to state that the letter in question was written by the Paris correspondent of our paper when here on a recent holiday trip, and doubtless he is perfectly able to defend himself, if he cares to do so, against the contemptuous and ill-judged remarks of the British editor. Surely the best answer Mr. Godwin could make will be to adopt Mr. Burges' suggestion, and publish a plan and view of Mr. Whistler's studio, when we can all judge of the justice or injustice of the criticism.—I am, &c.,

The English Correspondent of the "American Architect."

London, Dec. 4, 1878.

ANOTHER UNSATISFACTORY COMPETITION.

Sir,—Enclosed I forward you conditions of competition for a church at Bradford. You will notice that it looks very like an attempt to get "something for nothing." No premium is offered, with the result that the "successful man" (if the church is not erected) gets no reward for his labours. Surely it is time for this kind of competition to be brought to a sudden end.—I am, &c., Geo. B. Bulmer.

Park-row, Leeds, Dec. 4, 1878.

"Proposed Church in Victor-road, Manningham.—Extracts from Memoranda for Architects sending in Competitive Designs.—The proposed church must accommodate 750 persons. The total cost, including foundation of tower, carried up not less than 15ft. from the ground surface, and roofed, and including all fittings (except pulpit, font, communion table, tiling and carving) not to exceed £4,000. The design may provide for the completion of the tower, &c., at some future time. Plans and specifications to be sent, on or before the 31st inst., to the Rev. J. T. Maguinness, 9, Athol-road, Manningham, under a motto or word, with a sealed letter marked on the outside 'Victor-road Church,' and giving within the motto or word on the plan and the name and address of the competitor, which letter will not be opened until after the decision of the committee on the plans. All plans to be drawn to a scale of one eighth of an inch to the foot. A reliable estimate of the cost of the various works—viz., mason's, joiner's, slater's, plasterer's, plumber's, and painter's, and of the heating apparatus—must accompany the plans. Plans not adopted will be returned immediately after the decision of the committee. Plans and specifications accepted to become the property of the promoters if the works are proceeded with within six months. *The promoters do not bind themselves to erect the church, or proceed with the work within any given time, or at all. No premiums will be paid for plans sent in whether accepted or not.* The promoters stipulate that the architects shall not provide quantities for the contractors, but the plans and specifications must be sufficiently full, clear, and defined, to enable the contractors to take quantities.—December 3, 1878."

[The promoters of this competition apparently intend to amuse themselves at the expense of any architects simple enough to respond to their invitation.—Ed.]

The *World* hears that Mr. Ruskin has resigned the Slade Professorship at Oxford.

Mr. William Young, architect of Exeter Hall, Strand, who has already published several architectural works, has another in hand, shortly to be published by Messrs. Spon, of Charing-cross. It will be an illustrated volume on house and villa building, with considerable information in the way of letterpress, based chiefly upon buildings executed by the author. Several of the drawings have been prepared expressly for this work, and among them are some by Mr. Maurice B. Adams.

Intercommunication.

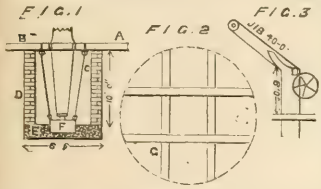
QUESTIONS.

[5604.]—**Cesspools.**—I would like to know the way to calculate the size of a cesspool suitable for a country house, and the best way of constructing same?—PECKSNIFF.

[5605.]—**Billiard Room Floor Covering.**—A billiard-room floor constructed with wood joists and floor boards, and plaster ceiling underneath, is covered with thick linoleum, but persons walking and cues striking the floor are heard in the room underneath. Will any subscriber oblige by suggesting any inexpensive soft material for laying under the linoleum to deaden the sound, or any other method?—A SUBSCRIBER.

[5606.]—**Gauge for Lead Pipes.**—Is there a gauge made for lead pipes, or would the B.W.G. answer the purpose?—HARROW.

[5607.]—**Foundations of Crane.**—Will some reader advise me with reference to the strength of foundation and stability of a crane I am about to erect in very loose ground, as I have a doubt as to strength? Fig. 1 shows section of well hole, &c.;



A, ground level; B, oak framing, 9in. × 9in.; C, iron tie-rods to stone; D, 9in. brick wall; E, concrete flooring, 1ft. 6in. thick; F, stone, 3ft. × 3ft. × 1ft. 6in. Specification: Dig out ground 6ft. 6in. × 6ft. 6in. × 11ft. 6in. deep, place in bottom a bed of concrete 1ft. 6in. thick, full size of well hole with stone bedded in centre (3ft. × 3ft. × 1ft. 6in.), to receive spindle of crane. Build a 9in. wall in brickwork on concrete bottom, 5ft. square in the clear up to within 9in. below level of ground, on which is laid a timber framing (Fig. 2) of 9in. square scantlings, bolted to stone below a platform of concrete 9in. thick (G), to be laid round framing. Any information respecting the above will oblige—S. S.

REPLIES.

[5575.]—**Solid Contents of Hollow Column.**—Your correspondent, "A. H. S.," gives as answer which is wholly incorrect. Three correct answers had been given in the BUILDING NEWS for Nov. 15; but, as they do not wholly explain their method, it may be worth while to examine it a little more closely. The cubic contents of a column which does not taper are equal to the sectional area × the length. The sectional area is clearly equal to the area of the outer circle minus that of the inner circle. The area of a circle $= \pi r^2$, where r = the radius or semi-diameter, and π is a constant quantity representing the ratio of the circumference to the diameter. This quantity may be taken as = 3·1416, or, roughly, as $= \frac{22}{7}$. To apply this method to the case in point:—

Area of larger circle (where $r = 4$)

$$= \frac{22}{7} \times 4^2 = \frac{22}{7} \times 16 = \frac{352}{7} \text{ cubic feet.}$$

Area of smaller circle (where $r = 3$)

$$= \frac{22}{7} \times 3^2 = \frac{22}{7} \times 9 = \frac{198}{7} \text{ cubic feet.}$$

Subtracting—

$$\therefore \frac{352}{7} - \frac{198}{7} = \frac{154}{7} = 22 = \text{area of section}$$

Multiplying by the length (30ft.), 22 × 30 = 660 cubic feet (answer). "A. H. S." has first assumed that the circumference = 3 × the diameter, which is not true; next, that a square and circle which have the same circumference will also have the same area, which is flagrantly wrong. By these means he has obtained a result nearly 200ft. from the truth. I may notice that the number ·7854 is ¼ of π, and is employed because the diameter is taken instead of the radius; also that the product of the sum and difference of the diameters taken by your correspondents is merely a convenient method of finding the difference of two squares, for $(a+b)(a-b) = a^2 - b^2$.—R. C. R.

[5595.]—**Furniture.**—I have just purchased, at 8s. each, some rush-seated chairs, the frames being beech, with a brown stain and black rings, the effect of which is quaint and artistic. They were made by Mr. Trapnell, College-green, Bristol, who is now making an arm and a carving-chair to my order.—C. E. P.

[5603.]—**Corn Exchange.**—If your correspondent would inspect Leeds Corn Exchange, he would, I think, find that the whole of the light is obtained from the roof for the central hall. The outer tier of shops and offices are lighted from the street.—E. B. W.

Our Office Table.

AT the Alexandra Hall, Clifton, last week, Mr. Gambier Parry delivered a lecture on "Early Christian Art." At great length the lecturer spoke of the many different representations which had been found of our Saviour; but it was a fact that no reliable portrait had ever been found either in literature or in art; and with reference to the nimbus, or aureola, found represented around the head of Christ, Mr. Parry said it had a beginning long before the Christian era, in many instances being not used as figurative of saintliness, but was used in the pictures of men and women of marked importance, such as kings, &c. Speaking of the various paintings of the Crucifixion, he said that the earliest known painting of this subject was not by Christian but by Pagan hands in the third century, and he enlarged upon the very many ideas entertained of it. The earliest representation of the Crucifixion with the letters "Inri" was at the beginning of the eighth century; for a very long time before that age the representation was only symbolic, but the clouds of heresy clearing from those dark ages the symbolism of the cross became a reality. The next illustration treated by the lecturer was that of the symbolism of the lamb, as representing Christ, and the figures of the crowning of the Virgin. The paintings of these subjects were the most beautiful of the early works of art.

AT the meeting of the Commissioners of Sewers of the City of London on Tuesday, it was stated that the electric light (Jablochkoff's system) would probably be exhibited on the Holborn-viaduct early next week. According to Mr. J. N. Shoolbred, who read a paper on the subject at the Society of Arts on Wednesday night, the cost of the Jablochkoff candles in the Avenue de l'Opéra, Paris, was 37·2fr. per hour. It was conceded that they gave double the light of the gas jets previously used, but as these cost only 7·25fr. per hour, the electric light was more than twice as costly as the equivalent amount of illumination from gas. The City of Paris declined to renew the contract, except at the same price as they paid for gas, and the electric lighting company has accepted the terms in the belief that they can materially reduce the cost. Mr. Shoolbred stated that the maximum photometric value of a Jablochkoff candle was only 300 standard candles, instead of 1,000, and the use of an opaline globe reduced it to 180. The theatre of the Society of Arts, and its approaches, were lit by electric lights on different systems, and the various machines were described by the lecturer by the aid of large diagrams.—The electric light was tried in Bristol Cathedral on Thursday evening, November 28, by the Rev. Philip Sleeman, F.R.A.S. It was intended more particularly to ascertain the effect of the electric light in illuminating the large open open space immediately in front of the choir screen; but a good general idea was also obtained of the results which might be realised if the light could be applied on a sufficiently extensive scale for the illumination of the nave itself. This is the first time that the electric light has been introduced within the walls of a cathedral.

IN a paper in the *Analyst* on Cleopatra's Needle, Mr. G. W. Wigner, F.C.S., who has recently analysed several portions of the monolith, gives some interesting particulars of its composition. In conclusion he says:—"I must point out what an act of vandalism it would be to cover such a stone as this with silicate solution, as has been proposed. Such a solution would not even fill up the pores of the weathered portion, and it could not sensibly increase the coherence of the porous surface. The only proper course is to fill the pores with a non-porous and neutral substance—such as paraffin wax, for instance."

IN his address at the annual meeting of the Royal Scottish Academy, on Tuesday evening, the president, Sir Daniel Macnee, remarked that some amateurs and their friends call their works suggestions—suggestions which it would puzzle them to carry out or even define. He advised all who heard him, in producing pictures, not to leave them in that mysterious state that their friends are all puzzled to know whether they mean anything; in which case it is pretty certain that they did not know themselves. These things were resorted to only by men who have not devoted much time to the study of their art. They cannot express what they think, or they have simply a dreamy thought, and they scratch in something in an uncertain way which their friends are apt to believe in. They may describe this to their friends as a suggestion meaning something or other; but if the whole world cannot see that there is someting like an intention, Sir Daniel thought the work had better have been left undone.

IN distributing the prizes won at the Portsmouth School of Science and Art, on Thursday week, Sir Henry Cole, alluding to the action brought by Mr. Whistler against Mr. Ruskin, said that the latter had accused him—in a periodical which he published himself—of having corrupted the system of art-teaching all over England into a state of falsehood from which it would take twenty years to recover. It happened that he was no artist, and did not know whether Mr. Ruskin was; at all events, they knew Mr. Ruskin had certain dogmatic processes which he thought only manifested true faith, and was not for anybody's "ism" but his own. Sometimes he went in for Turner, sometimes he was as vague as in the case of Whistler; at other times he was all for dash and splash, or for Sir David Cox, or for the fine attenuated drawing of Angelise; whilst often nothing was true faith that did not imitate Albert Dürer. The speaker was truly catholic in these matters, and saw beauty in all. He was no despot, and left the world and its manifestations open to everybody to follow, if they only tried to be honest. After the 1851 Exhibition took him from his fusty-musty occupations to organise art schools, at that time a very eminent man—quite as eminent, and not so erratic, nor with such a spice of wanton humour as Mr. Ruskin—Mr. Rice, was the apostle that laid down how they were to learn to draw, which was not a profound mystery, and was simply being accurate in some way or another. He (Sir Henry) used to be a friend of Mr. Ruskin, and could not understand why he should be stigmatised as a falsehood and an abortion. Both Mr. Rice and his successor (Mr. Redway) manifested artistic powers and acquirements very much in excess of the tender, delicate fiddle-faddle which Mr. Ruskin was accustomed to call the true faith; and, in spite of the imputation upon him, he ventured to say art was in a comparatively wholesome state. As their schools were in error, they had better get hold of Mr. Ruskin, tie his leg to the table, and not let him move till he had told them in a dry practical way how to get rid of their abominable heresy and abortive falsehoods.

"ONE OF THE NINETEEN REJECTED," "C. F. W." and others have written us complaining of the injustice, as they think, of their non-election as members of the Architectural Association at the last meeting, when no less than nineteen out of sixty-three candidates were black-balled, election being on that occasion by ballot instead of by the usual show of hands. We are called upon to give our opinion, but this we reserve, as it is necessarily difficult to do so without the facts on either side were before us. Of one thing, however, there can be little doubt—that the wholesale manner in which the right of refusal was exercised on the occasion referred to was the result of mismanagement rather than a desire to exclude eligible students. Unquestionably several persons, not strictly architectural students such as were intended for admission to the ranks of the Architectural Association, have hitherto "crept in unawares," so that it is probably necessary that elections in future should be more carefully conducted. If it is to be by ballot the system adopted by the R.I.B.A. seems to suggest itself as suitable for imitation, leaving the right of voting in the hands either of the committee, or those members who hold some sort of office in connection with the Architectural Association, or are members of the R.I.B.A.

REFERRING to the new law courts, the London correspondent of the *Leeds Mercury* says:—

"It was of course hardly possible for any public work to have been undertaken without numerous blunders by officials and others coming to light, and the history of the new law courts is perhaps more fertile than that of any other modern public building, the Houses of Parliament not excepted. The most recent display of official purblindness has, however, only just come to light. Whilst the "battle of the sites" was still being waged, but long after Mr. Street had prepared his ground plans, Parliament passed an Act by which the cumbersome process of paying Chancery suitors at the Bank of England was done away with, and a Chancery Pay-office, with an audit-office attached, was located in the dingy recesses of Chancery-lane. The time has now arrived for the officers connected with the law courts to shift into the quarters prepared for them in the new palace of justice, but it is found at the last moment that no provision has been made for the pay and audit offices, which were specially required to be in close connection with the law offices. The Office of Works, which is theoretically, if not actually, responsible for this blunder, after a certain pretence at bluster and shifting of responsibility, now placidly shrugs its shoulders, and tells the members of the two offices (in official language, of course) to shift for themselves."

There is a revived project on foot for amalgamating under one corporation the Society of Painters in Water Colours—"The Institute"—and the water-colour exhibition that is held annually at the Dudley Gallery. The originator of the idea is a well-known artist, who has long deplored the want of a national exhibition of water colours worthy of our school. He maintains that, inasmuch as Britain is the home of the art, adequate means should be provided in the metropolis for its thorough development. At present one has to travel from Trafalgar-square to Pall-mall, and from Pall-mall to Piccadilly, in order to obtain an adequate conception of the strength of a school "which is more native and to the manner born" than any other which may be termed peculiarly British. The idea is not regarded with favour by many of the old artists, but is manifestly gaining ground amongst the younger members of the profession. It is stated that premises have been secured for the new gallery in Piccadilly, on the opposite side to and not a hundred miles from Burlington House.

The Warrington Town Council decided at a meeting held on Friday night to introduce a bill next session, to acquire land on which to build gas-works; to deal with the line of buildings in streets; to require the conversion of privies, and the provision of sufficient privy accommodation; to open out ill-ventilated courts; to require courts and yards to be paved, or to pave the same and recover the costs thereof; to require notice to be given at or sent to the Town Hall of every case of infectious disease, and to pay medical men therefor; and to require the builder, owner, or lessee of any new house or building to obtain a certificate from the borough surveyor that such house or building is completed according to the byelaws of the borough, and with all necessary sanitary arrangements, before such house or building is occupied.

The prize of the Sketching Club, in connection with the Royal Architectural Museum, was presented at the meeting of the Club on Wednesday evening last to Mr. T. F. Pennington, for the best series of pen-and-ink sketches of ornament from casts in the Museum during the past session. The prize is five guineas in money, to be spent in architectural books, and is awarded and given by the Council of the Museum. Honourable mention was awarded to Mr. John W. Simpson, of Brighton. Several new members have joined the club, and good work is being done. A general meeting of the club is held at six o'clock on the first Wednesday evening of every month, but the members can sketch at any time. Mr. Maurice B. Adams acts as visitor to the club, and sometimes members of the Museum Council attend.

Two public meetings are to be held December 9th and 16th, at the Royal Institution, Colquitt-street, Liverpool, under the auspices of the Notes and Queries Society, for the free and impartial discussion of the principle and practice of modern architectural restoration. The following papers will be read:—"A Few Words on Restoration," by Mr. William Morris, M.A., Honorary Secretary of Society for Protection of Ancient Buildings; "The Æsthetic Grounds of Objection to Restoration," by Mr. Samuel Huggins, author of "A Plea for the Protection of our Ancient Cathedrals;" "Are the Views of the Society for the Preservation of Ancient Monuments unpractical?" by Mr. John J. Stevenson, Fellow of Royal Institute of British Architects; "The Historic Uses of Ancient Buildings," by Mr. James Bromley, of Liverpool. Letters will be read from Rev. Mark Pattison, Professor Sidney Colvin, Rev. W. J. Loftie, and Professor John Ruskin. Resolutions bearing on the principle of protection and on forthcoming legislation in defence of ancient monuments will be submitted by Mr. P. H. Rathbone, Mr. J. A. Picton, Mr. J. A. Noble, Mr. J. M. Hay, Mr. J. L. Bowes, Mr. Drinkwater, Mr. George Rose, Mr. W. Tirebuck, Mr. Walter Lewin, and Mr. F. Kempster, M.A.

With a view of encouraging the art of wood-carving, the Council of the Society of Arts propose to apply to that object a grant placed at their disposal by the Drapers' Company for promoting technical education. Signor Bulletti, of Florence, is to take charge of the classes. Messrs. Gillow and Co. have secured the use of a suitable house wherein to commence operations, and will also lend the necessary plant and models, and undertake to secure a sufficient amount of work for a year. The council will select and pay the fees for six months of four day students, who must undertake to attend during the whole of that time from 10 to 1 and 2 to 5, at least; and of four evening students, who must attend from 7 to 9, at least. Students must provide themselves with their own tools. All candidates for these studentships must have passed the 2nd-grade art examination of the Science and Art Department in freehand drawing at least. Those who have some knowledge of wood-carving, or have passed in the other subjects of the 2nd-grade art certificate, or in drawing from the antique and the figure, architectural drawing or designing, or in modelling, will be preferred. Candidates should send in their names at once, with particulars of their qualifications, to the secretary of the Society of Arts.

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CHIPS.

The Royal Academy have named Sir Frederick Leighton, President of the Royal Academy, as additional trustee of the Soane Museum, to succeed the late Sir Francis Grant; and the life trustees have appointed Mr. Alfred Waterhouse, architect, A.R.A., to succeed to the vacancy caused by the death of the late Mr. Frederick Pepys Cockerell, hon. secretary of the Royal Institute of British Architects.

The foundation stone of the new vestry hall of St. Mary Abbotts, Kensington, will be laid on Thursday next, and we hope to give a view and plans of the new building in our next issue. Mr. Robert Walker is the architect.

We regret to hear that Messrs. George Gilbert and John Oldrid Scott have sustained another bereavement in the death of their brother, Mr. Alwyne Gilbert Scott, B.A. and S.C.L., of Christchurch, Oxford, a barrister-at-law of the Inner Temple, who died at his residence, Woodlands, Henley-on-Thames, on Saturday week. Mr. Scott, who was the fourth and youngest son of the late Sir Gilbert Scott, was in his 30th year.

The fine old parish church at St. Peter Port, Guernsey, which already has 15 stained glass windows, has just received an addition to this number. The new window represents "The Baptism of our Lord" and the "Descent of the Holy Ghost." The work has been executed by Mr. W. G. Taylor, of Berners-street, W.

Finchley has just been constituted a Local Government Board district, and the first local board of 12 members has been formed. Hendon is also to have a local board.

New windows, with stained margins, have been placed in Camwhitton parish church. The work has been carried out by Messrs. Hill, of Carlisle.

A new chapel of ease has been opened at North Packwood, Warwickshire. The building is of brick, and has been erected from the designs of Messrs. Payne and Talbot, of Bennett's-hill, Birmingham, by Mr. John Smallwood, of Wootton Wawen. It is proposed shortly to insert in it a stained glass window to the memory of the late Mr. Wykeham Martin, M.P.; the work is in course of execution from the architect's designs by Mr. Swayne Bourne, of Birmingham.

A wing is about to be added to Chacewater Board Schools, Cornwall. Messrs. Mitchell and Odgers, of Scorrier, have taken the contract at £227.

Mr. Statham will deliver a "discourse" on the Logic of Architectural Design at the Royal Institution on Friday evening, Jan. 31.

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N.B.—DIAGRAMS AND PROSPECTUSES ON APPLICATION.

Messrs. Bird and Co., of Euston-road, who are agents for the new French marbles, have just issued a useful and comprehensive list of chimney-pieces, &c., manufactured in this material, accompanied by a well-executed sheet of chromos showing the different colours produced. To architects and builders residing at a distance their catalogue will prove exceedingly useful.

The Bethnal-green Board of Guardians received last week a report from the contractors for the new well at the workhouse, Messrs. T. Docwra and Son stating that they had gone to a depth of 199ft., and had found a good supply of water; they proposed to go another 51ft., making a total depth of 250ft., and believed that when this was completed, a fortnight hence, there would be a "splendid supply." The report was deemed highly satisfactory.

The municipal authority of Peterhead, Aberdeenshire, have just completed the transfer to themselves of the works of the local gas company, at a cost to the burgh of £12,000.

At a ratepayers' meeting held at Eastbourne, on Monday, a resolution was passed, with but three dissentients, formally approving the action of the local board in seeking to introduce a bill in the next session of Parliament for the acquirement of 12 acres of land on the sea-side, and in South-street, and the erection of a sea wall and local board offices. The gross outlay is estimated at about £71,000.

The town clerk of Leamington has been served with a writ by Messrs. Powis and Co., London, claiming £10,000 as balance of their contract for permanent works connected with the artesian well, and as damages for the contract having been taken out of their hands by the borough surveyor. Other actions respecting the artesian well are pending.

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MEETINGS FOR THE ENSUING WEEK.

MONDAY.—Institution of Surveyors. Paper by R. T. P. Dolley, on "The Rating of Railways, with Suggestions for the Amendment of the Law," 8 p.m.

" Society of Arts. Cantor Lecture, "Mathematical Instruments," by W. Mattieu Williams, No. 3, "Instruments for Measuring Angles and Straight Lines by Triangulation," 8 p.m.

WEDNESDAY.—Society of Arts. Hyde Clarke on "The Euphrates Valley Route to India," 8 p.m.

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WATER SUPPLY AND SANITARY MATTERS.

THAMES VALLEY DRAINAGE.—At a meeting of the Lower Thames Valley Main Sewerage Board, held on Wednesday night at Kingston, the City Solicitor (Mr. T. J. Nelson) in the chair, the special drainage committee reported that they had taken the necessary steps for obtaining an Act of Parliament to carry out Colonel Haywood's scheme. They also recommended that Colonel Haywood, and Messrs. Bailey, Denton, Son, and North, and Mr. Mansergh should receive 200 guineas each as authors of the three best schemes for disposing of the sewage which appeared to offer the best prospect of success. Mr. O. Waterfield, J.P., in moving the adoption of the report, explained that the board's plan was irrigation, combined with downward filtration, and he referred to a Government report to show that they were in accordance with the wisest advice which it was in their power to procure. He said not only did they intend to lay out 100 acres for downward filtration, but the wide area of land which they proposed to take would enable them to combine with their plan any scheme for purification which might hereafter turn out to be necessary. The motion was carried.

LEGAL INTELLIGENCE.

A FRAUDULENT BUILDER.—On 23rd Oct., at the Central Criminal Court, William Smale surrendered to receive judgment upon a charge of conspiracy to which he had pleaded guilty in May last, with intent to defraud his creditors by concealing a large amount of property, and endeavouring to defraud them by means of fictitious bills of sale. The defendant formerly carried on a very extensive business as a builder at South Lambeth, and it was alleged that at the time when he failed for £8,000, and, according to his statement of accounts, had no assets whatever, he was in reality carrying on a flourishing business, and could have paid more than 20s. in the pound. The creditors were very much dissatisfied with this state of affairs, and inquiries were made in the Bankruptcy Court, the result of which was the discovery that for several months previous to his bankruptcy the defendant and his solicitor, a gentleman named Knox, who at the time appeared to be in extensive and respectable practice, had been working out a most elaborate plan to defraud the creditors of the defendant by means of fictitious cheques and fictitious bills of sale, under which nearly the whole of the property possessed by the bankrupt was passed over to Knox; and, if the fraud had been successfully carried out, the creditors of the defendant would have been defrauded of the whole of their claim upon him, and he would have recommenced business with a large capital. A prosecution was instituted in this court, and the defendant, the solicitor Knox, and a servant of the defendant pleaded guilty to the charge of conspiracy; but judgment was respited upon the defendant undertaking to make all the reparation he could to his creditors by assisting them to recover the property that had been misappropriated. Judgment was passed upon Knox, in consequence of its being represented that he was in a dying state, and he had since died. Mr. Serjeant Ballantine addressed the court in mitigation of punishment.—The Recorder, in passing sentence upon the defendant, said that in all cases of this description it was his practice to look a great deal to the interest of the creditors, and where a defendant really made reparation by giving up any property at his disposal for their benefit, he was generally disposed to pass a lenient sentence. In this case, however, the defendant did not appear to have made any attempt to carry out the undertaking he had entered into for the benefit of his creditors, but, on the contrary, he appeared to have resisted them in every possible way, and the result was that they had been defrauded to a large amount. Under these circumstances he felt it his duty to order the defendant to be imprisoned and kept to hard labour for eighteen months.

DISPUTES AS TO CONTRACTS.—At Halifax County Court, on the 19th ult., two actions were brought by C. Whitehead and Sons, contractors, of Ravensthorpe, against Enoch Ravensley, stone merchant, Brighouse. In the first case a balance of £25 10s. 4d. was claimed upon the erection of a house at Rastrick, but the contracts showed a clause stipulating that all questions arising out of it should be referred to Mr. Rogerson, architect, of Brighouse, whose decision should be final, and the judge said this ousted his jurisdiction, and he ordered nonsuit accordingly. In the second case a balance of £16 19s. 2½d. was sued for in a contract for building two houses at Brighouse. The contract was for £211 3s. 10½d., and plaintiffs admitted the receipt of £194 4s. 8d. Defendant, however, produced receipts for £210 4s. 8d., and the judge having heard particulars of a set off, ordered plaintiffs to pay defendant £3 8s. 2½d. on the counter claim.

Trade News.

WAGES MOVEMENT.

ARBROATH.—The master joiners of Arbroath have declined the request of their workmen to make the reduction of wages ½d. per hour instead of 1d., and the workmen have accepted the reduction from 7d. to 6d. under protest.

BELFAST.—The master builders of Belfast propose reducing the wages of the carpenters from 7½d. to 7d. per hour and making an extension of the town boundary, outside which extra payment is allowed for lodgings and travelling. The reply of the men, about 700 in number, was given on Monday, opposing the boundary question, and asking the masters to adhere to the former compact, by which it was agreed to give three months' notice of alterations in the scale of pay. The Belfast stonecutters' wages have been reduced from 8d. to 7½d. per hour, and notice has been given of another ½d. per hour reduction in three months.

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FITZROY WORKS, 356 TO 369, EUSTON ROAD, LONDON.

ALSO AT DEPTFORD, LIVERPOOL, GLASGOW, & CYPRUS.

CRIEFF.—At a meeting on Friday evening of the unemployed and employed operative masons of Crieff, it was agreed by a majority to accept work at the reduction of another 1d. per hour.

HASTINGS.—The master builders having refused to withdraw the notices which had been issued for a reduction of wages, the workmen in the employ of fourteen firms went out on strike on Monday week.

SITTINGBOURNE.—This district is now feeling the effects of the existing depression in trade, which until recently it had escaped. There is no demand for bricks, and the price has fallen considerably. In consequence the manufacturers are retrenching, and in some instances have reduced the wages of their workmen and discharged the unhired men. One of the largest firms has discharged several of their oldest workpeople.

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TENDERS.

BATTERSEA.—For erecting new house for school-keeper at Tennyson-road School, Battersea, for the London School Board:—

Jerrard S. J. (accepted)	£350		

BOURNEMOUTH.—For the erection of new offices for the proprietors of the *Bournemouth Observer* offices. Mr. C. C. Creeke, architect:—

Davis	£3,085	0	0
Trayte	2,976	0	0
Hawker	2,950	0	0
McWilliam	2,928	7	1
James	2,784	0	0
Minty	2,750	0	0
Jones and Son	2,725	0	0
Stroud	2,702	13	0
Hammerton Bros. and Vine ..	2,695	0	0
Hoare Bros. and Walden ...	2,690	0	0
Chant	2,642	5	0
Jenkins and Son	2,544	0	0
Huxtable	2,506	17	10
Lawson and Stanley	2,471	13	0
George (accepted)	2,387	0	0

CHISWICK.—For erecting schools and mission hall in Sutton-lane, in connection with Trinity Church, for the Rev. Wm. Frith. Mr. Richard Tomlinson, architect; quantities supplied:—

Barnes, J. (accepted)	£463	

CHISWICK.—For finishing detached house in Brandenburgh-road. Mr. Richard Tomlinson, architect; quantities supplied:—

Johnstone, R. (accepted)	£263	

DAYBROOK.—For two semi-detached houses to be built at Daybrook, Nottinghamshire, for Mr. John Robinson. Mr. Herbert Walker, architect; quantities supplied:—

Mason	£912	13	0
Lynam	736	0	0
Duke	709	10	0
Clarke	700	0	0
Clayson and Mould	679	2	6
Scott	676	0	0
Cargill	669	0	0
Knowles	655	0	0
Tutin	630	0	0
Wayto	627	0	0
Green	625	0	0
Crookes and Foster	621	14	0
McCulloch	619	10	0
Dudson and Parrish	606	0	0
Smith and Graves	590	0	0
Stainforth	580	4	0
Bains and Turton	575	0	0

GUILDFORD.—For additions to Wey-gate, Guildown, Guildford:—

Mitchell Brothers...	£590	15	9
Smith W., and Sons	570	0	0
Nye R.	540	0	0
Goddard and Sons	524	0	0
Colls and Sons (accepted)	520	0	0

GUNNERSBURY, W.—For erecting two detached corner houses on the Gunnersbury Estate for A. Bassano, Esq. Mr. Richard Tomlinson, architect; quantities supplied:

Taylor, F.	£3,520
Johnstone, R.	3,469
Niblett, E.	3,273
Taylor	3,173
Stephenson, G.	3,121
Shapley, G.	2,880
Taylor and Son	2,850
Parker and Evans	2,800
Keefe,* R.	2,492

* Accepted, subject to alterations.

GUNNERSBURY.—For finishing Bellevue House, Heathfield Gardens, for Miss Edwards. Mr. Richard Tomlinson, architect:—

Johnstone, R.	£350
Ireland, T. (accepted)	270
Bailey, J.	250

HASTINGS.—For houses at Bexhill for Mr. Pearson. Mr. F. Plowman, architect:—

Coney and Hobern	£940
Taylor	925
Timewell	920
Huggins	790
Stevens (accepted)	720
Parker	685

KING'S-CROSS, N.—For converting 30 windows in front of school in York-road, King's-cross, into double windows, for the London School Board:—

Gover (accepted)...	£332.

LEWISHAM.—For alterations and additions to the Potters' Arms, Lewisham. Mr. Horace T. Bonner, architect; quantities supplied:—

Smeaton	£505
Higgs, J.	397
Jerrard, S. J.	397

LEYTONSTONE.—For the erection of an 8-roomed house at Leytonstone, Essex. Mr. Robert Griggs, architect:—

Arber, W.	£744
Wood, G. T..	720
Fillett, B.	708
Caius, E.	700
Sayer, D.	630

LIVERPOOL.—For alterations to premises, 16, Colquette-street, for G. M. Byrne, Esq. Mr. J. Walker Bates, architect, 5, Harrington-street, Liverpool:—

Tancred, John (accepted).	

LIVERPOOL.—For building villa residences, Princes-gardens, Sefton-park. Mr. J. Walker Bates, architect, Liverpool:—

Dean and Caton (bricklaying, joiner, slater, and plumber works—accepted) ...	£2,100

NOTTING-HILL-GATE.—For enlarging school in course of erection in Silver-street, Notting-hill-gate, by 120 places for boys and girls, for the London School Board:—

Stimpson and Co., of Brompton (accepted on their contract schedule of prices).	

RAMSGATE.—For villa residence, Dane-park, Ramsgate, for W. Allen, Esq.:—

Goodman	£2,112
Burkitt	2,040
Shapley	1,975
Parker and Evans	1,775
Starke	1,775
Martin	1,675

RIPLEY, DERBYSHIRE.—For laying down drain pipes for the Town Sewerage:—

Slater and Son, Derby (accepted) ...	£639 14 3

[Lowest of 8 tenders received, the highest of which was £898.]

SALISBURY.—For the erection of a pair of semi-detached houses at Elm Grove for Mr. S. Curtis. Mr. Fred Bath, architect:—

Exclusive of smith's, plumber's, painter's, glazier's, and bellhanger's work:	
Tryhorn, P	£650
Sawkins and Mist	550
Young, E., and Sons (accepted)	480

SALISBURY.—For additions to the lodge at Fisherton Cemetery for the Fisherton Burial Board. Mr. Fred Bath, architect:—

Newton, Fred	£120	0	0
Harris, Gilbert	101	12	6
Kite, H. J.	95	6	0
Witt, Edward	93	8	0
Harris, Abel (accepted)... ...	80	10	0

SEDGLEY.—For the erection of schools for 450 children, in three departments, at Red-hall, Lower Gornal, for the Sedgley School Board. Mr. Brewitt, architect:—

Horton, of Brierley Hill (accepted) ...	£3,098

[Lowest tender; the highest sent in was £3,907.]

TOTTENHAM.—For the construction of roads and sewers at High Cross Estate, Tottenham, for A. Waterer, Esq. Mr. Horace A. Alexander, surveyor:—

Dunmore	£2,615
Bloomfield	2,397
Bell, John	2,231
Harris, W. (accepted)	2,120

WOOLSTON.—For the erection of Board School for 350 boys, master's residence, boundary walls; and fences at Woolston, near Southampton, for the St. Mary Extra School Board. Mr. W. H. Mitchell, Southampton, architect:—

Stevens and Son	£2,984
Brinton and Bone	2,890
Crook, John	2,879
Dyer, Jas.	2,825
Rowland, J. W. (accepted)	2,770

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THE BUILDING NEWS.

LONDON, FRIDAY, DECEMBER 13, 1878.

ROYAL ACADEMY DISTRIBUTION OF PRIZES.

THE annual distribution of prizes took place on Tuesday last, the 10th December. Not being the gold medal year the proceedings are only witnessed by the members and students of the Academy, and there is no formal address from the chair. The circumstance, however, of its being the first occasion on which the just elected president, Sir Frederick Leighton, would wear the medal and chain of office, there was a very large muster, and the lecture-room was filled to overflowing. Sir Frederick's entrance into the room was the signal for all rising to their feet, and the most hearty welcome was given him, concluding with three tremendous cheers. Previous to giving the prizes the president spoke of the agreeable task which he had that evening to perform—one, however, which was bound up with very important duties, for the high prestige of the Academy depended to no slight extent on the upholding of the standard of the teaching in the school, and in the awards of the medals only when the works exhibited merited them. He paid a tribute to Sir Francis Grant's memory, whose interest was so great in the Academy that even when death's hand was almost upon him he could not be persuaded to leave any part of his duties unperformed, especially those connected with the distribution of awards. The medals were then awarded—on four occasions lady students stepping forward to receive prizes for the architectural section. The travelling studentship for one year, worth £130, was awarded to Mr. William Scott, the first medal for measured drawings to Mr. R. W. Gibson, the second medal to Mr. Frank Baggally, and the perspective medal to Mr. W. H. Wood. The subject for the travelling studentship was a provincial town hall, the site not to exceed 40,000ft. super., including areas, and to be surrounded on three sides by streets, the fourth side facing an open square. The chief requirements were in three categories—first, a borough or sessions court, with accommodation for the magistrates, jurors, male and female witnesses, barrister and solicitors, &c., with a special entrance and waiting-hall for the public, and grand jury and other rooms above; secondly, an assembly-room of 5,000ft. super. area, with orchestra, refreshment and cloak-rooms, special entrances and staircases; and, thirdly, the municipal offices—viz., the mayor's reception and banquetting-rooms and private room, the council-chamber, and sets of offices for the town clerk, borough accountant, borough surveyor, school board and committee-rooms. The drawings required were plans of the ground and first floor, to a scale of 16ft. to 1in., principal elevation ⅛in. scale, and one perspective. There were four competitors this year, which is above the usual average; three of them sent in Gothic designs, the fourth Italian. Excepting the design sent in under the motto "Suo sed Suis" the regulations of the instructions do not appear to have been followed as regards the separation of the three divisions given in the programme. "Each bird her nest esteemeth best" places the entrance to the municipal offices in the centre of main part; to the borough court and offices on the left at the back; and to the assembly-rooms on the right at the back; the principal staircase is badly arranged, and the separation of the three divisions is not maintained. The principal elevation has a central tower and wings; the windows lighting the main front reminds us somewhat of Mr. E. W. Godwin's work and design. The tower is Rhenish in character. "Che sara sara" (Mr. William Scott's, to which the studentship is awarded) distinguishes the entrance hall and corridors by a pink tint on his plan, which shows at once how much space has been wasted in them. There is an utter confusion between the three divisions, both on ground and first floor, and the unusual thickness of the walls gives an apparent false scale to his drawing, so that his rooms appear much smaller than they really are. Mr. Scott's elevation and perspective, however, are very boldly and vigorously drawn, and the decision in their favour quite carries out the idea that the Academy, in these competitions, look more for skilful and dexterous compositions in architectural elevations than well-arranged plans. Mr. Scott's perspective is by far the best, and as this is the second time he has competed, every one will be glad to hear of his success. "Trois Étoiles," the Classic design, is somewhat German in style, and reminds us of Berlin examples. The assembly hall is placed on the ground floor, and in the centre of the building, and the corridor which surrounds it becomes, therefore, the only communication between the several offices in the building. This would lead to many complications, and render the proper working of the building very difficult. The elevation is extremely well drawn, being spoilt in its composition, however, by the crowning of the tower with an open belfry in the form of the choragic monument of Lysicrates, capped by a conical roof. "Sui sed suis" has an extremely sensible and well-studied design. The municipal offices, borough court and offices, and the assembly-rooms all have their separate entrances and staircases, and are kept quite distinct on all the floors—the position of all the offices is carefully thought out. The elevation is well drawn, and is good in style. Exception might be taken to the single dormer window on each side of the main front, to the existence of a gallery or corridor in the front on the ground floor, which is out of character with the building, and would darken the rooms beyond. The chief defect of the main front lies in the excessive plainness of the towers which flank it; they cut short the fine range of first-floor windows—windows which light rooms of such importance that we should have thought they would have been carried along to each end and made features of, as in Mr. Waterhouse's Manchester Town Hall. The author has evidently experienced some difficulty in knowing what use to turn these dark rooms in his towers to. In the perspective, which is in pencil only, the left-hand tower is still more prominent, and out of scale and harmony with the rest of the building. The two other competitions this year were those for the silver medals for measured drawings, and for perspective and sciography. In the first there were four competitors, the subject being "The Entrance Gateway to Somerset House." At first sight the subject seems to be a simple one. A glance, however, at the drawings, which are full of work and very elaborate, corrects that idea. This gateway is perhaps the best specimen of Sir William Chambers's work in London. The mouldings are of great purity of outline, and the simplicity of the fret borders and other ornament attest to his great refinement in artistic detail. The drawings required were plans, half showing ground and half ceiling or vault—a longitudinal and transverse section, and a sheet of details. Mr. R. W. Gibson's drawings, to whom the first medal has been awarded, are as fine a set as has ever been exhibited, the management of the fine detail work in the small scale drawings being extremely dexterous, whilst the execution of the large scale drawing is extremely artistic in line, and drawn with much feeling. Mr. Baggally's drawings, to which the silver medal was awarded, are, perhaps, bolder and more vigorous, though less artistic—his detail being especially remarkable. For the perspective medal there were two competitors, the subject being a perspective of the porch of the Temple Church. As a specimen of sciography the subject is by no means an easy or pleasant one, and when it is noted that in addition to the drawing of the perspective the competitors were bound to measure the building (there being no published drawing of sufficient accuracy), it will be seen that the work to be got through was more than it is hardly fair to expect. The general aspect of Mr. Wood's perspective, motto "Mens" (to which the medal was awarded), is better than his rival's (motto, cross on a shield), though in the drawing of the ornament he is less vigorous.

THE INSTITUTE OF PAINTERS IN WATER COLOURS—WINTER EXHIBITION.—II.

THE present exhibition is full of interest, and the works include many studies of well-known artists. Landscape, historic and figure subjects are numerous, and we may pick out a score or more of very creditable performances. Glancing at a few of the more noticeable of these, we begin with Mr. Harry Johnson's "Vixen Tor (the Sphinx), Dartmoor" (14)—a wild moorlike piece of scenery, broadly treated. The heath blossom is cleverly introduced. No 12, by the same artist ("A Dartmoor 'Clam'"), requires to be looked at from a short distance. There is much decision of touch, though verging on the crude, but the picture lacks some of the higher qualities of finish. No. 10, also ("Lincoln's Inn Fields"), by Mr. John Fulleylove, who contributes several other sketches, has the merit of being broadly handled, though perhaps somewhat at a sacrifice of clearness. We presume the sketch represents the normal state of atmosphere in that singularly quiet locality. "Tête-à-Tête" (21) is a cleverly-drawn couple—a lady and gentleman—engaged in conversation, in the costume of a century ago. Mr. C. Green is the artist. Commons and moors form a subject that has largely employed the powers of exhibitors. Mr. J. W. Whymper's "Sketch on the Skirts of Burnham Common" shows a spirited study of a gnarled oak, with a depth of tone and freedom of manipulation that betoken a master of the subject. "A Rough Common," by Mr. E. M. Wimperis, is less taking in style, though indicative of a skilled hand; but "A Welsh Lane," by the same, is exceedingly happy in the foliage and colouring. Mr. H. B. Roberts' "Dull Blade" (29) is an intensely natural study of quiet humour. The scene is a barber's shop, in which a boy sits on a stool, waiting to be operated upon; an old man is grinding a pair of dull scissors at the window, his head turned partly round, with a countenance of penurious misery. We hardly know which looks the dullest, the old barber or his neglected blade; but the expression on the youth's face—one of astonishment and pity—is equally clever. Another piece by Mr. Harry Johnson is entitled "A Summer Day on the Rother" (30)—a bright and vivid sketch from nature, in which a light fleecy touch, so characteristic of Mr. Johnson's work, is displayed in the foliage. In "Halford Hall, Cheshire" (32) Mr. Fulleylove has given us a charming subject; but the drawing of the old timbered work is indifferent. A very thrilling piece is Mr. Chas. J. Staniland's "On the Sands"

(33). It represents a disabled vessel on the sands, clinging to the bowsprit of which is a woman, a man clasping her by the waist. A vessel that has come to the rescue has thrown out a rope, and three or four gallant sailors are making their way to the wrecked boat. The surf, with its white foam, the woman's pitiful expression, and the sailors are admirably depicted. Mr. L. J. Wood sends several Continental sketches of much beauty in execution and colour. His "Göttingen" (43) exhibits a picturesqe bit of German street scenery, softly coloured and well drawn; "The Oudeburg, Ghent" (70), shows an old gateway of the fortress built by Baldwin Bras de Fer, in 868; "Nôtre Dame, Dijon" (72), is a pleasing and richly-toned sketch; "Place St. Pharaïlde, Ghent" (94), a charming grouping of picturesque gables, so abundant in Belgium, drawn and coloured with considerable feeling; and "Falaise, Normandy" (152), a splendid bit of ecclesiastical architecture, rendered in the same spirit, but a little faulty in its perspective. Mr. Wood is happy in the selection of subjects, and in depicting old architecture. His tints are aërial, rich, and soft, if somewhat wanting in vigour of drawing. Mr. Gow's "Saturday Afternoon" (46) is a pleasing picture. The juveniles, busily occupied in looking over scrap-books—especially the little girl seated on the floor—are well drawn; and the artist has conveyed in a natural manner the intense interest of the youthful students, left alone to their self-devoted task. We are always delighted at Mr. Louis Haghe's works. His "Courtyard of the Plantin Museum, Antwerp" (47) displays all the usual qualities of that gifted master of architectural effects. The building is an interesting brick structure; and the arcade, ivy-grown walls, and group of figures, make a good picture. Another striking drawing by Mr. Haghe is "Au Revoir" (84). It represents a fine old stone staircase of Late Gothic—a style so eminently characteristic of some of Mr. Haghe's best works. The traceried balustrading is exquisitely drawn, with all the force and piquancy of which the author is master. A group of figures is shown on the stairs, in the picturesque court dress of the time. The outstretched hand of the departing guest, the good-tempered old lady with the ruffle, the child by her side, and the exquisite half tints and reflected lights on the stone mouldings are all details of interest. Mr. Small's "Summer Time" (51) is one of those simple natural scenes of country life that become interesting in proportion to the care and fidelity displayed by the artist in detail. The drying clothes, the young girl spreading them on the grass, and the figures of playful boys, are all well drawn, and true to nature. Mr. James D. Linton, in his "Cup of Tea" (75), has scarcely chosen the happiest of models. The young lady in low dress, seated by the fireplace, has an exceedingly thick complexion, hardly in unison with her light evening dress, which her decided *embonpoint* does not redeem. No. 96 ("Ancient Norman Screen, Cathedral Close, Winchester") has a laboured look; and Mr. Chase, though a conscientious delineator, evidently errs on the side of finical detail, always destructive of artistic effect. His "Studies at Haddon Hall" (123) are also somewhat spoilt by this weakness. Mr. E. M. Wimperis, in his study of "Birch Trees on the Llugwy" (100), exhibits his graphic power of expressing foliage; and Mr. G. Clausen, in "Fisher Folk at Church, Island of Urk, Zuyderzee" (65) reveals an equally masterly study of countenance, and truthful drawing of homely life, rendered with the grace and feeling of an accomplished master. Mr. Hubert Herkomer, an artist of fast-rising celebrity, exhibits one picture remarkable for the boldness of its conception and vigour of execution. Visitors to the exhibition will be struck especially with No. 236 ("Siegfried Capturing the Bear—Nieblungenlied"), but few will probably understand the conception. We may here say Mr. Herkomer has sought to embody one of those semi-historic myths of the mediæval folk-lore of Germany, in which Siegfried, a national hero, is shown capturing a bear. The idea of the German epic is admirably rendered in the artist's drawing; Siegfried, with his invisible mantle, is shown behind a grand forest tree, whose trunk and branches fill up the picture, and give a half weird effect. The depth of colouring—so distinguishable a quality in all Mr. Herkomer's pictures—the dark recesses of the forest, and the power and boldness of the conception admirably portray the story of the myth; and the visitor will look twice before he is convinced that the drawing is a water colour at all. The same master's "Studies" of heads (145 and 153) are striking examples of portraiture in a similar depth of tone. The woman's face is perhaps even more natural, if ordinary, than the man's. There is nothing ideal or sentimental; we have a genuine portrait of a middle-aged woman, without pretence to good looks, in which the lineaments, or features, are esssentially Teutonic. They might be mistaken for oil portraits. In No. 273 ("A Phrenologist") the artist represents a life-size portrait of an elderly man, holding a human skull, and apparently engaged in reading its character. Cleverly painted is Mr. W. Wilson's "Baiting" (104), a title well chosen by the artist, the double meaning intended to be conveyed being obvious. The subject is a group of fisherwomen, but the leading feature is a fisher-girl looking up very wistfully on the face of a young fisher-man, to which glance the meaning of the motto, "Such witching looks are baited hooks," is well applied. The old man, and the woman seated behind, listening to some gossip near her, the general grouping, drawing, and colour are admirably rendered, and this picture is certainly one of the most succsssful in the gallery. That inimitable painter in water colours, Carl Werner, exhibits a beautiful drawing of "The Erechtheum on the Acropolis, Athens" (122), displaying all the colour and warmth of that masterpiece of Greek architecture. The same artist's "Propylexes, Athens" (272), is another charming sketch, in which the caryatides of that unique example of Ionic are rendered with the refinement of the master; but the deep blue sky, contrasting with the rich warm tone of the Pentelic marble, is the chief charm. Mr. Guido R. Bach's "Leading the Flock, Egypt" (139), is a striking study of an Egpytian shepherdess, drawn with much feeling. No. 163, "By the River of Babylon," is a fine study on the cxxxvii. Psalm, in which Mr. A. Bouvier has produced a soft stippled effect of a pathetic subject. As an historic composition, Mr. Charles Cattermole's "Seizure of Charles I. at Holmby House" is not wanting in dramatic effect. The king is about to be seized in his bedchamber by Cornet Joyce and attendant officers, his majesty being shown half-dressed seated upon the bed. The artist has taken his conception from a passage in Clarendon's "History of the Rebellion." There is a lack of vigour in the handling. Mr. Cattermole's "Hamlet and the Players" (214) is far more successful, and well sustains the artist's power for dramatic personation. The intent and grouping of the players and the rich deep colouring are excellent. Mr. P. F. Poole's "Cave of Mammon," from Spenser's "Faërie Queen" (248) is another picture of considerable merit. There is a weird-like effect in the cave and the boat, and the half-defined handling and shadows sustain this illusion. "Memories" (261) is a young lady in white satin turning over an old packet of letters. She is engaged reading one, and the artist has well portrayed the melancholy interest it awakens in the expression. The rich boudoir-like accessories and the satin dress and gown are admirably drawn. We have little space left to do justice to many other excellent works; therefore we can but briefly notice "Actors in an Inn Yard" (197), by Mr. Townley Green, a clever reminiscence of the old inn stage; "Across the Heath" (191), by Mr. G. S. Kilburne, admirable in drawing and colour; Mr. E. J. Gregory's fine "Studies of Heads" (228, 245); Mr. Hughes' "Readers' Room in the Plantin Museum" (249); "The Invalid," by Mr. M. L. Gow; "Waste Land," by Mr. E. M. Wimperis; "The Puritan," by Mr. Seymour Lucas (289); "Great Hall, Levens, Westmoreland" (290), by Mr. J. Fulleylove; some admirable sketches for *Punch*, by Mr. John Tenniel, in which Lord Beaconsfield is cleverly burlesqued in the artist's inimitable manner; and a few other water-colour sketches on the screens. The collection, we may add, is more varied and interesting than it was on the last occasion, and we can advise those who are interested in water colours to pay the Institute a visit.

MR. CRACE'S COLLECTION OF OLD ENGRAVINGS AND MAPS OF LONDON.

PROBABLY the largest and most interesting collection of old engravings, maps, and sketches ever brought together, illustrative of Old London, is that to be opened to the public shortly at South Kensington. These have been lent by J. G. Crace, Esq., and have been carefully arranged in one of the large galleries in Queen's-road, by Mr. Frederick Crace. It would be impossible in a brief notice, and after the very cursory examination we have been able to make at a private view, to convey to the reader any adequate notion of the extent and interest of Mr. Crace's valuable collection, though a rough idea of the number brought together may be gathered from the fact that Mr. Crace has collected something like 1,000 maps of Old London and 5,000 views, many of which are now exhibited for the first time. We understand this work has taken the best part of a lifetime, representing the labour of forty years. The engravings and views embrace the works of Wyngaerde, Visscher, Hollar, Hoeye, Kip, Hulfbergh, Vertue, Maurer, Canaleti, Hogarth, Vardy, Shepherd, Jukes, Pugin and Rowlandson, Nash, Allen, &c. There are many old wood prints, mezzotint, aquatint, water colour, pencil, and pen-and-ink sketches, and the archæologist and architect will find a fund of almost interminable interest and value in examining the many memorials of the metropolis during the last three centuries. As illustrating the progress of drawing and engraving alone Mr. Crace's exhibition must be deemed one of intense interest, for we can trace the progress of wood block engraving, line or copperplate, mezzotinto, stippling, aquatinta, lithographic, and other styles. The general views of London are arranged along the walls, while the screens exhibit in detail the sectional localities and buildings of interest, beginning at Kensington and proceeding to the City; so that a visitor can study the various changes any given district or locality has undergone with the aid of general views and maps of contemporary dates. At the upper end of the gallery we have a splendid series of old views of London. For instance, that numbered 5 is a large bird's-eye view of London, Westminster, and Southwark. It is a fine pen-and-ink fac-simile, by N. Whitlock, from the original drawing by Antonio Van den Wyngaerde (about 1550), now in the Suther-

land collection in the Bodleian Library at Oxford. It is 10ft. long by 17in. high, and extends from Whitehall in west to the palace at Greenwich, called "Placentia," in the east. It shows Old St. Paul's with its spire, Old London Bridge, Suffolk House, Southwark—a fine Elizabethan mansion—Westminster Abbey without its towers, &c. The drawing is supposed to have been made by order of Philip of Spain, before he married Mary, and is a remarkably fine one. Another general view of London, from St. Catherine's to Palace at Westminster, 86in. by 18in., is signed "J. C. Visscher delineavit," and has descriptions in Latin in tablets above. A fine view, signed "Winceslaus Hollar," covers a similar field of view; it is dated 1647, and published by Cornelius Danckvers. There are emblems at the top. Like that of Visscher it shows all the principal buildings—London-bridge, St. "Pauwl's" Church without spire, and the towers of the old City churches; while the locality of Southwark, with St. Mary Overie, Winchester House, the Bear-garden, Globe, and many interesting bits of old timbered buildings, are detailed with much minuteness. Another fine engraving is signed "Rombant Van den Hoeye," and is dated 1650, indicating many of the same parts. We cannot mention a tithe part of the engraved views, but they all lend a value in identification, and throw much collateral light upon one another. One remarkable engraved view is that showing St. James's Park. It is about 7ft. by 4ft. Old St. James's Palace, the park with its rows of chesnuts, the Mall, Duke of Marlborough's house, Pall-mall, St. James's-square and church, St. Anne's Church, Lester-fields, and a hundred other features are indicated, while the river Thames forms the background, over which not a bridge was then visible. This view is entitled "Veue et Perspective de la Ville de Londre, Westminster, Parc St. Jacques," and is signed "John Kip delineavit et sculp." The date is 1700. Various other views of St. James's, including "Marlborough House" and "View of German Chapel," by J. G. Buckler, 1827; "Old Horse Guards," by Mayett, 1651, &c., are exhibited. A pencil drawing of the latter, formerly in Dr. Gower's possession, and various prints and sketches of the same, by Maurer and others, are unique examples of delineation of the 18th century.

Several valuable views of Buckingham House, one dated 1710, are deserving of notice. Of that interesting locality, Tothill-fields, Westminster, there are various water-colour and mezzotinto views. We note Emanuel Hospital, founded by Lady Dacre, 1595; pencil sketches of Pest-house, Penitentiary, Millbank, by Capon; Greycoat School, Tothill-fields, 1698; Emery-hill Almshouses, Rochester-row.

The engravings and views of Westminster Abbey are complete. One engraving in line represents a north-west view, with the spire as designed for the crossing by Wren. This spire is pierced with openings to the top in several tiers. The engraving is signed "J. James delt." "Judge Jeffreys' House in Duke-street"—drawing dated 1853, and prints of "Storey-gate, the Old Almonry," will be looked at with interest by all admirers of Queen Anne. Various reminiscences of Whitehall are to be found. We notice the Horse Guards, by J. Vardy, delt.; the Admiralty, the New Horse Guards, according to Repton's design; view of Whitehall, showing the old gateway in front of Inigo Jones's Palace; a fine mezzotint, by J. H. Shepherd, of Horse Guards. One of the most interesting sections is, devoted to Charing-cross and the Strand. Several old views and sketches, showing Northumberland House and Charing-cross about the middle of the 18th century, are of great interest to the connoisseur. One is by Maurer, dated 1740; another by Canaleti, 1753; also a fine print of "Night," as "invented, painted, engraved, and published by W. Hogarth, 1738." A water-colour sketch of "Old Hungerford Market" as it was in 1805, and some recent views of the new market, as designed by Mr. C. Fowler in 1834, indicate the earlier history of that transformed locality. The views, maps, and engravings illustrating the "Strand" exhibit, in a remarkably clear manner, the architectural progress that has taken place since the early part of the last century. Two fine engravings showing processions—one of "Charity Children" upon the 7th of July, 1713, appointed by Queen Anne as a public thanksgiving for peace, with the well-known name of G. Virtue delint.; and another, a "Masonic Procession" drawn up in front of Old Somerset House in April 1742—give a capital idea of the houses that then lined the street. Old Somerset House in the last view is clearly detailed, with its centre columnar entrance and low wings, and many of the old timbered buildings of Charles I. and the Commonwealth are to be recognised in the view. A fine aquatinta view of "Old Somerset House," by F. Jukes, dated 1777, dedicated to the Rt. Hon. Earl Ashburnham, and another to the Rt. Hon. Earl Harcourt, give a fair idea of the original building as designed by John of Padua. "Covent Garden" and "Drury Lane" are represented by some choice engravings and sketches, a mezzotinto by Pugin and Rowlandson 1812, and various representations of the fire in Covent-garden, the old church of Inigo Jones appearing in a dozen different forms.

We can only now mention that other districts are equally well shown. Thus the French Horn Inn, Holborn, with its quaint galleried court-yard by that clever sketcher in water colours (T. H. Shepherd), together with views of Holborn Bars, Middle Row, the Bull and Gate Inn and yard, old Furnival's Inn, with its rich pilastered front of brick, will all be found worth inspection by the denizen of this part of London; but one of the most curious prints is a satire with doggrel verse written upon Nash's spire of Langham Church so bitterly lampooned by the critics of his day. The print, dated 1829, is entitled "Nashional Taste!!! dedicated without permission to the Church Commissioners." Below a badly-drawn view of the spire in question, perched upon the top of which is a caricature of the Court architect himself, are the lines in two couplets:—

> Providence sends meat,
> The Devil sends Cooks,
> Parliament sends funds,
> But who sends the Architect?

The most valuable part of Mr. Crace's collection are the maps and plans ranging in date from the 15th century to the most recent, so that the archæologist or topographer can trace the gradual extension of the metropolis upon a series of maps collected and arranged from the beginning of the 16th century to the present day. We notice one of special interest, with date 1560, a copy by G. Vertue, of the ancient map by Ralph Aggas, engraved about 1560, but not published till 1603. A plan of improvements in the Strand, in St. Clement's parish, 1802, will be found of exceeding interest in prospect of further demolition. One plan, though looking rather fresh in colour, is assigned to Wren. It shows intended additions to St. James's Palace in the reign of William III., dated 1694; other plans of great value show City property at the Bank of England, College of Physicians, and a curious time-stained plan of the Pest-house, Craven-hill, Bayswater, with signatures of Lord Craven and others, as produced in court by Mr. Crace in 1868, and understood to have decided questions of ownership of the Craven Hill property, is to be seen. To those who are studying the past history of London either as antiquaries or as architects, to many who are desirous of studying the limits of old properties, and to all admirers of the picturesque architecture of the 16th and 17th centuries, now rapidly disappearing from our view, Mr. Crace's collection will become of inestimable interest and value as a means of reference, and would furnish the most unerring materials for the archæological history of the metropolis during the last two centuries.

SIX CENTRAL-AREA CHURCHES.

THE publication in your last number of Mr. Brydon's interesting design for Truro Cathedral naturally recalls some other recent designs on the "central-area" principle; and a few remarks on them may help to show both the advantages and the difficulties of this very promising form of plan. First in importance is Mr. Carpenter's striking design for Manchester Cathedral. This has a nave with double aisles, a choir and transepts with aisles on either side, and an octagon at the crossing, apparently some 70ft. or 80ft. in diameter. Anything like detailed criticism of so vast a scheme is out of the question in a letter; but two or three points suggest themselves at the first view. It is hard to see, in the first place, what is the use of a nave with double aisles for an Anglican service. If there were an altar in each aisle, one could better understand the purpose of the arrangement; but as it is, at least half the congregation west of the octagon would see neither altar nor pulpit. I do not lay stress on the inconvenience of such a building for preaching in, because a cathedral is not, and should not be, a mere place for the delivery of sermons: but on its inconvenience for worship of any type recognised by the Church of England. Even the musical service, it is to be feared, would be badly heard in the nave, not only through the multitude of sound-shadows from the four ranges of piers, but from the lofty interposing lantern. This would almost certainly swallow up much of the sound, and leave only a faint residuum for the lower western area. A nave like this, it is true, might be abandoned as a place for holding services in, and made, after the fashion of the aisles and transepts of Westminster Abbey, into a mausoleum for Lancashire heroes. For this, however, its style is not the most suitable. There was a discussion many years ago in the BUILDING NEWS on the question whether Gothic architecture harmonises with the highest class of painting and sculpture; and the general opinion seemed to be that it did not. What most of the disputants meant by Gothic was evidently Gothic with fully developed tracery; and meaning this there seems little doubt that they reached the right conclusion. We must choose between high art decoration and tracery decoration—the two things do not do together. We may have Lancet Gothic and noble sculpture, or Geometrical Gothic and exaggerated sculpture: a strong monumental style with painting and sculpture of the same class, or a comparatively fanciful style with fantastic and more or less distorted figures—only in this way is harmony to be secured. The distortion and eccentricity of middle and late Gothic sculpture did not come by chance: it is through no accident that we find our best examples at Wells and not at Exeter. On the other hand, taking the style for granted, Mr. Carpenter's design is treated for the most part with the dignity and severity which we look for in his work. The interior of the lantern, and probably the choir and transepts, would be extremely striking, but one cannot help fearing that a lantern of such immense size and height would overpower the nave both inside and

out. The danger is that it would look like the fragment of a great design, surrounded by the petty work which characterises too much English church-building. The nave, by itself, might be, architecturally, a fine one, and there is little doubt that the central octagon would be finer still; but the two, without some alteration, would be likely to spoil each other. Wren, who, with all his faults of detail, had a feeling for proportion seldom surpassed, seems to have felt this about St. Paul's; and though the central area there does dwarf the internal avenues into something almost like passages, the central dome over it does not dwarf the outside of the nave. Its architect was determined that the outside of his church, at any rate, should have unity and cohesion: he felt that a broad and lofty nave, not cut up by aisles and clerestory, was a necessity in presence of his large and lofty dome—and not seeing how to gain his end by fair means, he gained it by foul ones. In other words, he built those outrageous shams, the screen walls, which hide the clerestory: and so, by making the nave look like an immense aisleless one, he made it a match for the feature which threatened to crush it. What Wren did by a sham might, however, be done by perfectly honest means. A triple-roofed nave—loftier, but of the same type as the new one at Bristol—would do it, and if its roofs were of high pitch it might naturally end in a grand three-gabled narthex like that at Peterborough. For a lantern so huge as this needs not only an unusually massive-looking nave, but an unusually impressive west front, large in scale and bold in composition. It was a true instinct, I think, which added the central lantern to the western tower and two flanking towers at Ely; and that triple-towered arrangement, together with the triple-arched one at Peterborough, are perhaps the only two yet invented which would really hold their own against so vast a central tower as Mr. Carpenter's.

Returning to the nave there is yet one other type which would stand its ground inside and out—which, added to Mr. Carpenter's choir, transepts, and central area, would make a church of unsurpassed grandeur, perfectly fit for a great congregation, and far more "of a piece" than his present design. It is a type which has been used before, when architects had not yet grown timid and left everything great and daring to engineers. It is the type found at Gerona, at Alby, at the late Dominican Church of Ghent—with a vault in one span about as wide as Mr. Carpenter's three middle avenues put together, and with buttresses, partly internal, which may be cut through to give a passage next the walls. Such a scheme, if developed with the ability which characterises the rest of Mr. Carpenter's design, might certainly be carried out. It is easier sometimes to do great things than small ones, and multitudes of people will exert themselves to realise a grand conception who very wisely would not lift a finger to increase the crowd of commonplace things amongst which we all live, and move, and have our being. I do not mean that the design for Manchester Cathedral is not, almost everywhere, much above commonplace: on the contrary, it is so promising that one cannot help wishing it more promising still. The nave is now, I think, its weakest point, both for interior and exterior effect, and it might easily be made one of the strongest. A nave in one span would naturally open into the octagon by three arches, as the nave of Gerona opens into the choir; but for the sake of abutment the two side arches might be oblique, and the nave consequently an apsidal-ended one. The aisled choir and transepts, like the aisled choir at Gerona, would give scale to the building, the church would increase in richness eastward, and the octagon would form a fine transition from the one part to the other. Externally there would be in reality—what there is at St. Paul's only in pretence—an immense nave, of unusual height: and this nave, which would be the ruin of any church with an ordinary-sized tower, would be the very thing to set off and harmonise with the great central lantern. Such a cathedral would tower above even such a city as Manchester, and its architectural grandeur would be gained not by ignoring, but by fully accepting and providing for, the real wants of a great modern town.

There is little space left to notice the other five designs on the "central-area" system which, more or less recently, have appeared in the BUILDING NEWS. Mr. Brydon, in his sketch for Truro Cathedral, takes a hint from Siena, and makes his central area a hexagon. This has the advantage, with an aisled nave, of making the middle aisle wider and more important than is possible with an octagon—and so of helping it to contend better with the great central space. It has the practical merit, too, of reducing the obstruction from the nave-piers, by removing them somewhat towards the sides of the building. Outwardly, a six-sided lantern is a difficult thing to deal with, but it might, perhaps, be more manageable if brought into a dodecagon just above the great arches. This form, indeed, is rare, if not so rare as a hexagonal one: but Messrs. Texier and Pullan illustrate such a lantern (in a simple round-arched style) in their drawings of St. Sophia, Trebizond. The same form seems to occur amongst the early churches at Athens.

Messrs. Burder and Baker's design for St. Michael's, Northampton, has, in spite of its plainness, much character and individuality—it is to be regretted that so interesting a scheme is not now being carried out. The plan, it is true, very nearly resembles one submitted by Messrs. Sulman and Rhodes in competion for a church at South Shields—the working out of which, though crude, was suggestive. Messrs. Burder and Baker have unmistakeably retained much that belonged to this earlier attempt; but they have, quite as unmistakeably, transformed it, and made it their own. Mr. Turner's church at Harlesden has a plan which differs from the last two, in having the octagon wider than the nave and aisles which open into it. Judging only from the published views, the interior would seem by far the most successful part of this design. The octagon is covered by eight intersecting roofs—as at Christ Church, Westminster-road—an ingenious system with some picturesqueness about it, but not a really satisfactory treatment, as it stands, for the centre of a large church. The position of the flèche looks, though it may not be, structurally a weak one, and the flèche itself is too small to be effective. Messrs. Paull and Bickerdike's work for the Rev. Newman Hall's congregation has been so fully illustrated and discussed in the BUILDING NEWS, that little need be said about it. From some points of view it has a very charming effect, and the detail, generally, is well studied and graceful. Hardly any one, I suppose, would pronounce the wooden galleries a success; and the tower should certainly have been in some symmetrical position with regard to the central flèche, rather than in that which is almost universal in Nonconformist churches, and which, as Mr. Freeman long ago remarked, is one of the worst that can possibly be found—namely, on one side of the front gable.

JAMES CUBITT.

Early on Monday morning St. Peter's Church, Huntstall, near Bridgwater, was discovered to be on fire, and in a few hours nothing but the bare walls remained of one of the finest Late Perpendicular country churches of Somerset.

WINDOWS.*

(Concluded from p. 557.)

AMONG the objections to casements of a larger size is that they take up a great deal of room, and, if they open outwards, they are apt to be broken by the wind, and if inwards they interfere with curtains, &c. Another objection to their opening inwards is the difficulty of keeping out the weather, unless an expensive water-bar is employed. The objections to a large hung sash are the weight of lifting and shutting, and the great difficulty of cleaning, as all know by seeing servants hanging out of top-floor windows, with their legs wedged in by the top sash, which is pulled down for cleaning, and prevents them falling over. The advantages of casements are their ease of opening, shutting, and cleaning; and to my mind their appearance. The advantages of hung sashes are their compactness and their very great facilities for regulating the temperature of rooms, which is of much importance, and which certainly is not so satisfactory in a casement unless a mullioned and transomed window is employed, when the upper portion may have sashes hung by the lower rail and falling inwards, which probably is the most satisfactory arrangement for direct ventilation that can be. Tobin's mode of ventilation by inserting small vertical tubes, with bell-shaped mouths, in the lower rail of the upper sash is as good as any means for ventilation in the ordinary sash window, and can be easily applied to existing windows. Currall's ventilator inserted in the lower sash is also effectual, though it might be improved in appearance. I have also a model here of a patent known as "Melville's Patent Lifting, Lowering, and Locking Sash Apparatus," by which the sashes are opened and shut by a small apparatus at the side, worked on a rack and pinion. This apparatus is intended more especially for large windows in basements, business premises, and in such other places where the window is often required to be left open a small distance, and not moved by any one else. It has also the advantage of dispensing with all sash-lines, pulleys, fastenings, lifts, handles, &c. Another arrangement has been brought to my notice, invented by Mr. Abrahams, of 65, Rosoman-street. This, however, I have not been able to see in use. The principle here is the ordinary double-hung sash in three divisions, with a centre portion opening inwards. This allows of the ingress of air, while the top sash, being slightly lowered, allows of its egress. The centre portion falls down inwards flat against the lower sash, thus allowing the upper one to be cleaned from the inside. An invention worth notice in connection with the sash window has lately been brought out by Mr. Charles Brothers, a full-sized model of which may be seen at the Museum of Building Appliances, and a later one at Messrs. Trollope's Museum, Halkin-street. This arrangement, which was fully described in the BUILDING NEWS of April 12th, 1878, mainly consists in hanging the whole of the sash and frame in the rebate of the window opening, thus affording when open a very ready means for examination of the weights, sash-line, &c., and also for cleaning without any interference with the frame, as in the ordinary sash. The whole is locked when closed from the inside, and there is also an ingenious bolt in the hanging stile, which allows the window to be opened a certain way only, thus preventing the temptation to a burglar of a partly open window leading to his getting in by that means, as the sash will not rise unless a small knob, accessible only from the inside, is moved. The top sash is also fitted with a means of ventilation through the top rail, also regulated at will. The inventor informs me that the additional cost is about 2s. a foot super. The frame is kept air-tight by indiarubber tubes fitted in frame rebate. With regard to the ordinary sash window, the usual practice in drawing them is to take a pair of dividers and divide the window equally for the meeting bars. I have always found it preferable to make the lower sash somewhat the larger, and in order when open to obtain the full advantage

* A paper read by ASTON WEBB at the Architectural Association, Nov. 22, 1878.

to make the head of the frame differ slightly from the ordinary one, thus enabling the lower sash to go up into it and the window to open wider, and I have not found this to add at all to the expense of the frame. Another method is to allow the lower sashes to slide up through the head of the frame as shown here, the opening being filled by a piece of rounded oak which goes up and down with the sash, working in a groove as shown. Large sashes are occasionally hung on centres, as at Messrs. Tapling's warehouse in Gresham-street, but this mode is not generally convenient, and unlikely to come into general use. Lifts and pulls should always be used, sunk lifts being the best, and brass guards fitted to the top rail of the lower sash will be found very useful where the Venetian blinds are placed (as is often the case where no preparation has been made for them), so that they fall on to the lower sash. Messrs. Meaking's arrangement for the opening and shutting of sash windows, though rather intricate, is often extremely useful, especially where, by reason of a large sideboard, desk, or some other fixed piece of furniture, the window is not easily accessible. One other small matter in connection with hung sashes is worth mention—viz., that it is a good plan to have the pulley stiles of frame made in oak. It adds very little to the cost, and makes a great difference in the ease with which the sashes are moved. Another patent, by Messrs. Tonks, is worth notice for the improvement and ease of sash lifting, besides an arrangement of lifts somewhat similar to Messrs. Meaking's. A brass guide is fixed to the pulley, still wheels being fixed in the sash to run in same, which greatly lightens the weight of the sash. Stout unbleached hemp cord is as good as anything for sashes of an ordinary size, and this and strong brass axle pulleys should always be carefully examined before any work is passed by the architect. Many metal sash-lines have been introduced, and are probably known to all of you, as well as the numerous devices for fastening same to sash and weights. I have no time to mention these, and would only add on this subject that it is advisable to connect the line with the sash about one-third from the top. The window opening having now been filled with sash and frame we may briefly consider the architectural treatment of the window internally, and firstly in passing we may notice that splayed jambs are a modern innovation so far as the general run of windows are concerned, and are moreover a decided advantage to the light admitted by the window into the room. Boxing shutters, one of the great difficulties in arranging the internal finishings, are, as already mentioned, rapidly disappearing in face of the additional security given by plate glass. The chief points to be kept in view in designing the internal finishings of the ordinary domestic window are—firstly, that they in no way interfere with the light admitted; secondly, that they are convenient for the Venetian or roller blinds; thirdly, that they are convenient for the curtains; and, finally, that they do not interfere with the furniture generally. Firstly as to light. It is important, as already mentioned, that the light should be as near the ceiling as possible; wide architraves are therefore to be avoided, as if they are continued over the head of the window they necessarily bring down the head. Elaborate architraves also are, as a rule, only labour thrown away, for as soon as the curtains are up they are seen no more, except by the housemaids or a curious visitor. They should, of course, be in keeping with the general character of the room in which they are, but any elaborate enrichment, such as might be legitimately employed round the architrave of a door is out of place round a window. The jamb linings, on the other hand, which are always in strong light, might often have more attention and care bestowed in their design than is usually the case. Secondly, as to the arrangements made for blinds: This, in the usual way, is entirely overlooked by the speculating builder. Architects often keep the soffit of the linings about 3in. above the frame, which makes a fairly convenient space for the blind, though it has the disadvantage of lowering the window head. A better way is, I think, to form a box above the lining, which can receive either a roller or Venetian blind, and when pulled up is out of sight and obstructs no light. The usual way of hanging Venetians cuts off at least 6in. of the most valuable light when drawn fully up, and when this is added to the architrave and cornice, it brings your window-head at least 2ft. from the ceiling, which is more than it should be in a London dwelling-house, of which I am especially speaking. The third consideration in the arrangement of window finishings internally is the hanging of curtains. One great advance of recent years in improvement in this direction is the abolition of deep scalloped valances which many upholsterers will still induce your clients to have, unless you keep a very vigilant eye on them, not merely till the house is out of the builder's hands, but also furnished; and I confess I cannot understand the feeling of those who seem to consider that the attention now paid by architects to this particular branch of their profession—viz., the furnishing of houses designed by them—is immaterial to them, for surely the internal *decoration* of a house has always been considered part of his vocation, and a careful architect will design all his cornices, joinery, and mouldings with a view to their subsequent decoration; yet surely all this trouble is entirely thrown away if he has no voice in the furnishing. What becomes of all his carefully-selected contrasts and harmonies in paint and paper if the carpet and curtains are in discord with them? But to return to the more immediate subject before us, in place of a deep valance cut and tortured into fantastic shapes, and imparting a funereal aspect to the room, we now use a plain brass rod or wood pole, with solid turned ends, and on the rod brass or wood rings carry the curtains—these should be carefully selected to harmonise with the colours in the room, and be of a length very slightly to exceed the height of the window. The old system of draping the curtains, and spreading the ends over the floor, tends very much to darken the room, and the curtains thus spread are inconvenient, and to my mind unsightly. Extreme fulness in curtains is also a mistake; if they are made half as wide again as the space they have to cover when drawn, they will be found quite full enough, and will not be so inconvenient when pulled back. Window seats are an old fashion which seems to have been almost wholly abandoned in the present day in favour of the modern window back. No doubt, the small increase of space has been the main object of this alteration, and in town houses it is still probably indispensible; but in sacrificing it we undoubtedly sacrifice one of the pleasantest seats in a room. Think of any room you know of blessed with window-seats, and try and remember where in your leisure and idle moments you naturally sit, and I think you will find it is in the seat in the window. Without it, however fine the view, you can only enjoy it probably standing, for you cannot well pull a chair up in front of the window; but if there is a window-seat, you drop down into it naturally, and can enjoy the view at your leisure, and in this sketch of the interior of a drawing-room in an old house, called Weston Hall, Staffordshire, here, as is often the case in houses of a similar date, the whole depth of the bay-window is converted into one large seat or couch, and this is by far the favourite seat in the room, and when well cushioned, imitates almost the luxuriousness of the East. A deep fixed seat in the window gives, too, an air of comfort to a room which nothing else hardly can give. And now, gentlemen, I have slightly touched on most of the points I have had in my mind in relation to windows, especially to windows in town dwellings. The importance of the subject it is impossible to exaggerate, and when we consider how much the dignity and refinement in an elevation depends on the treatment of its windows, and how much the comfort, security, and health of the inmates also depend on the careful and scientific arrangement of the windows, we feel at once that it is one of the first subjects to which every student of architecture should turn his earnest attention. It is, in fact, the *summum bonum* of architecture, the one great leading feature which should bind together the elevation and plan, and generally speaking, upon the measure of success with which this is done will depend the appreciation and merit of the design. Remember, the first great use of a window is the admission of light, full and sufficient. Gray speaks of "rich windows that exclude the light, and passages that lead to nothing." Modern architecture should not be open to this reproach. We read in the Bible that next after the creation of the world God said "let there be light, and there was light," and after that record it is not for man to say there shall be darkness and exclude the light. Depend upon it wherever this is done it is wrong. Light and sunbeams mean life and health to all men, and he who excludes the one excludes the other. The second great use of a window is that we may look out of it and enjoy the prospect, whatever it be, and any arrangement which does not admit of this we may at once recognise as wrong (though there are, of course, cases where no look-out is preferable to the only one to be obtained). The third great use of a window is the admission of air and the ventilation of our rooms, without which we could none of us "live out half our days." And, fourthly and lastly, if we attempt fairly to carry out these three great cardinal points in the arrangement of our windows we shall find that our elevations will become more truthful and representative of the spirit of our age, and the architecture of the nineteenth century may continue to be worthy of the title bestowed on it as the "Printing press of nations." And now, gentlemen, I greatly fear I have told you little that you did not know before, but if my paper may be the means of our thinking out these matters more, each for ourselves, it will have done some good, and the pleasure it has caused me to write it will be shared also, to some extent, by you.

ARCHITECTURAL ASSOCIATION.

A FORTNIGHTLY meeting of the Association was held on Friday evening: the President, Mr. H. L. Florence, in the chair.

THE RECENT BLACKBALLING.

Mr. J. Douglass Mathews asked the President whether a certain number of candidates for membership—19 out of 62—were not blackballed at the last meeting, and if so would he give the names of the gentlemen objected to, and the number of votes recorded against them. Mr. Hayes (hon. sec.) said he had not the list of nominations with him, not knowing they would be called for. The numbers of those voting were not taken, but about 35 or 40 used the ballot-box each time. Mr. Mathews inquired whether some were rejected out of each batch. He wished to know whether there was a real intention to exclude those condidates, or if members simply tired of voting so many times. The President said the result of the balloting was to most members utterly unexpected. When he found that several in each batch were blackballed he pointed out to the members that a rejected candidate could not again be proposed for a year, and that one adverse vote neutralised five favourable ones. For some time afterwards there was no rejections, but in the last ten no fewer than five were blackballed. A Member said that one of those rejected had informed him he did not know a single member except his proposer and seconder, and could not, therefore, imagine the cause for being blackballed. Another speaker said he had belonged since the time when it met in Lyon's-inn, and that his son had been looking forward to joining in turn, but ha been rejected. He looked upon it as rathe hard. Mr. Mathews said a grave stigma ha been thrown on gentlemen who had wished to join, and handed in a notice signed by 12 members requesting the president to convene a special meeting for that day week (to-night) at 8 p.m., to consider the following proposed addition to rule 10, "In each case in which a ballot is demanded notice shall be forwarded in writing to the proposer and seconder by the hon. secs., at least three days before the election. If necessary the election to be postponed until such notice shall have been given." Mr. Riddett gave notice of an alternative motion to add to rule 11, which states that "no one whose nomination has been voted upon and negatived shall be again nominated during the same session," the words "without the consent of the committee." The following were elected by a show of hands with-

out opposition:—T. H. Letts, F. H. Jennings, C. Stuart Smith, Martin Saunders, H. Stanley Saunders, W. Martin, Blizzard, Goodwin, J. Jeffries, Hawley, Dyball, D. S. Henderson, A. Morton, J. E. Arpin, J. Coutts, and H. Fry. The President read a letter from Mrs. F. P. Cockerell, in reply to the expression of condolence forwarded her, in which that lady said that none of the testimonies to her husband's memory were more delightful than those from members of the profession he loved so dearly.

ORGANS IN CHURCHES.

Mr. Somers Clarke, jun., read a paper on the architectural treatment of organs, limiting his scope to a consideration of their introduction into new churches. He premised that he did not wish to be guilty of speaking as though the organ were the one thing for which churches and choirs existed, although he feared too often organists adopted this standpoint. As an illustration Mr. Clarke mentioned that he once accompanied Dr. Wesley, late organist at Hereford Cathedral, one of the most accomplished organists and performers of this century, to a large church in a country town, where the organ stood exceedingly well in a lofty and open chancel aisle, conveniently near the singers and vestry. The doctor admitted that the arrangement was fair, but added, "If that church were mine I would take out the east window, throw open a great arch, and stand the organ over the altar. How it would sound down the church!" The lecturer divided his subject into two portions—first describing the machine itself; and secondly considering its best position, and the conditions of that position, including external as well as general treatment. The old-fashioned organ was to the spectator often a splendid monumental but frequently a cumbrous and unmeaning thing; the modern one is an ugly box surmounted by a stack of pipes, reminding one of a zinc-worker's premises in the New-road. On further investigation the architect finds this case takes up a great deal of room, but has not anything very substantial inside. A great many little sticks, a vast amount of dust and other things not to be understood, but generally a large box somewhere near the roof, and this box often presents a most ugly and obtruside appearance from the outside. Speaking generally, an organ consists of four main divisions—the great organ, the swell organ, the choir organ, and the pedal—the first three being controlled by manual key-boards, and the fourth by a pedal-board. Each division is complete in itself, and consists of the pipes, the wind-chest on which they stand, and mechanism connecting these divisions with the key-boards—common to all air-bellows, a wind reservoir and trunks for conveying air to the various parts; and lastly the swell-organ is enclosed in the unwieldy box already referred to. The question arises what space ought to be allowed so as to commodiously accommodate an average instrument, the blower, and the player. Too often an organ of needless size is put into a church, one of fifty stops being obtained where one of thirty would sound more effectively. If the architect knows from the first that he is to stable such a monster he is to blame if he does not do so to advantage, but where he cannot tell what is coming, but has only to make "adequate provision for a suitable organ," he can no more be condemned if the roaring monster be pent up than if the pulpit will not hold a Daniel Lambert. Considerable height is needed for an average instrument, for the pedal department has pipes 16ft. speaking length, mounted on a block at least 2ft. above the floor; and further the other departments should be proportionately raised, so that the sound may get away above the heads of the people, and the inclosure of the lower part of the case. Reference may be made on this and other points to "Organs and Organ Building" by Messrs. Hopkins and Rimbault, the standard work on the subject.* As to floor space, a square of from 14ft. to 16ft. on a side, according to the number of pedal stops employed, will suffice. Thus, in an average-sized church, to accommodate 600 people, the average organ will probably occupy a space of 16ft. deep by 16ft. across and 20ft. high. Proceeding to his second division—the position of the organ and its consequent conditions—the lecturer thought we ought not to take precedent as a guide in the same way that we do in our architectural details, for the organ as we use it did not exist in mediæval churches. As by general consent the choir is now placed in the chancel, the organ should not be far away from the voices it is to support and accompany; indeed, those few persons who advocate its removal to the west end belong to the class who hold that the church and choir exist solely for the glorification of the organ. Accepting, then, a position near the chancel, it must be considered whether there ought to be built an organ-chamber, a transept, or an aisle—whether the organ ought to be divided, whether bracketed out from the wall, whether it shall be on the floor or raised, and, if the latter, what inconveniences may result; whether it shall be blown by an engine or by hand. Over and above all these points our plans and sections must show that the organ will not interfere with the convenient use of the church by the clergy and congregation, and will not darken nor obstruct the chancel. The organist also must be well placed for seeing and hearing, and artificial light, increasing the risk of fire, must not be needed by him. The first and great desideratum is that there should be abundant space about the organ, and, above all, height. What the designing architect calls an organ-chamber is too often regarded by the organist as a species of enlarged dog-kennel with two little doors, one to the chancel and one to the aisle—the whole thing, arches and all crammed with pipes whistling and screaming at one another, and the bulk of them half above the crowns of the little doors aforesaid. The larger and more complete the organ is that is placed in this conventional chamber the worse will be the result, as each individual portion of the instrument has less space about it. In many instances an organ costing, say, £1,000, and so placed, is less powerful in effect and less pleasing in tone than would be one with half the number of stops in the same position. If the plan and sections of a new church are such as to make it most desirable that there shall be a building more or less of the nature of an organ-chamber, it is of the first importance that this shall be as thoroughly one with the church as possible. Several instances might be mentioned in which the receptacle is in itself of ample proportions, but the arches into the chancel are low, much impairing the quality of the tone. The roof of the chamber and also the openings into chancel and aisle, should be as lofty as possible. Avoid an arch into the aisle and continue the aisle roof (if the aisle be lofty) right over the organ, or treat the chamber as a comparatively shallow and broad recess cutting into the main roof of chancel like a transept. With the latter treatment the organ front can be made conterminous with or even project beyond the line of chancel wall, and thus the unsatisfactory effect of a large break in the length of wall will be avoided. As an example of the mode in which the several parts of an organ may be modified in position to suit various situations the great organ at the west end of the Marien Kirche at Lubeck was mentioned; this instrument is upwards of 80ft. high and 40ft. wide, but not more than 7ft. or 8ft. deep. Unless there be far more height than we generally get in modern churches, it is not well to build a projection for the organ with the vestry below, or if it must be done only the back part of the instrument will be over the vestry, the front part coming down to the floor. In consequence of the smallness of modern towers, and the necessary thickness of the walls in proportion to the size of the openings through them, the conversion of the lower part of the tower to the use of an organ-chamber is about one of the worst, and, unfortunately, one of the most usual places that can be selected. An instance of a successful treatment of the organ in a tower is to be seen at St. Mary Magdalene's, Paddington, but here there is a good deal of height and clear space above. Of an instrument well placed in a shallow recess a good example is that at St. Peter's Church, Vauxhall.

(*To be concluded.*)

* A much more comprehensive work by Mr. John Watson Warman is now appearing in the pages of the *English Mechanic and World of Science*.—Ed. B. N.

OUR COMMONPLACE COLUMN.

FARM BUILDINGS.

Large straggling buildings are inconvenient and cost much in repair. Near the house and farmyard there should be a small paved court, separated from the yard by a low wall. In this court, which should communicate with the dairy, the utensils may be placed on proper benches to air and dry in the sun (Dairy). The yard or yards in a large farm should be sheltered on the north side by the barns, which need not be so extensive as used formerly to be thought necessary. Owing to the improved system of stacking corn in the open air modern barns are much smaller than formerly, their chief use being to contain a threshing floor or floors. This floor, where smaller seeds are threshed out, such as clover and the grasses, is usually in the middle of the barn, and made of stone, brick, oak, or tempered earth, those of oak, formed of planks 2½in. thick, dowelled or ploughed and tongued together, being considered the best. Free circulation of air is an important item to be considered in constructing barns. If barns are roofed with tiles they should be bedded in coarse hay, and if with thatch, reeds are to be preferred. A small yard should be provided independent of the other mentioned above, with sheds for cattle to shelter in. The cart sheds should be in the stack-yard, which properly occupies a space north of the barn. On each side of the yard should be placed the stables, cowhouses, &c., and feeding stalls, near which should be a pump, also a convenient place to put hay, straw, and turnips, and the machine for cutting the same. Light thatched roofs are sufficient for the sheds and smaller buildings, and even the cow-houses and stables. The house (detached from the farm-buildings) should have a tiled or slated roof.—J. A.

FIREPLACE.

The fireplace was used in the smaller apartments of houses even in Norman times, and numerous examples are to be found in buildings as early as the 13th century, as in Aydon Castle, Northumberland. At this period the fireplace was usually a plain opening, with corbelled mantle and moulded shelf; many have pyramidal hoods as at Netley Abbey. In the Perpendicular style the fireplace was much ornamented, and many rich examples of Tudor fireplaces may be found in the old residences and manor-houses. Some of these have been reproduced lately—the leading feature in them being a wide opening, deep enough for seats, arched near the ceiling; in the centre and back of opening the grate with its andiron is placed. The sides of fireplace are sometimes enriched with carving, plaster ornamentation, or tiles. We refer the reader to fireplaces at Mayfield, Sussex; Apthorpe, Northhants (opening of which is 6ft. × 4ft. 9in.); St. Cross Hospital, Winchester; Palace at Linlithgow (a wide opening of 20ft. 10in., divided into three by pillars and hooded); fireplace at Dirleton Castle, &c.; also to Viollet-le-Duc's "Dictionary"—article Cheminé. See also Dollman's "Ancient Domestic Architecture."

FIREPROOF BUILDINGS.

To confine the risk of fire in buildings "J. A." observes the building should be divided into compartments, and so constructed that the contents of one compartment might be consumed by fire without calcining, melting, or otherwise destroying the surrounding horizontal and upright partitions, and thus stopping the fire from spreading to the other rooms or floors. It has been thought that stone or brick divisions and external walls, lintels, and staircases of iron, floors or landings of tiles, iron, and stone, would be the nearest approach to the construction of a fireproof building; but Captain Shaw says:—"Stone is in no sense fireproof; on the contrary it yields to fire sooner than almost any building material, much more rapidly than wood. It is true that it does not, like wood, add fuel to the fire, but it does worse, as its known tendency to split off from the walls and fall down altogether prevents the firemen from availing themselves of the best positions for their work, which they can almost always occupy where there are wooden staircases." Cast-iron columns are now much used for supporting floors of warehouses and shops, but

when subjected to a temperature of 2,786° or 2,787° Fahr., which is probably below that of the centre of a large building on fire, it becomes liquid. It is therefore advisable to have occasional brick columns and wooden posts well coated in plaster, and the remaining iron columns to a considerable extent also coated with plaster. Good oak posts, with girders and joists well filled in with proper concrete prepared for the purpose, are perhaps more fireproof than any arrangement of iron and brick or stone construction. The experiments of Captain Shaw showed that even inflammable pitch-pine posts, 12in. thick, were perfectly proof against any heat that could be applied to them. Solutions of muriate of ammonia, muriate of soda, sal-ammoniac, borax, alum, and several other salts and alkalies with which wood may be impregnated, or which may be applied to the surface, may, to a certain extent, render timber incombustible. [The most fire-resisting material is concrete when made of calcined materials.]

FIREPROOF CONSTRUCTION.

Under this head we may simply confine the reader's attention to the leading types by fireproof floors. There are several kinds claiming notice, the peculiarity of which chiefly consists in imbedding iron girders and joists in concrete. We may name Fox and Barrett's patent system of arches between iron flanged girders, with ties and concrete filling in to level of floor; and the French system, in which the filling in is placed upon iron beams crossed by bars, a flat centring being used below to form a plaster of Paris ceiling. The chief French systems are the *Système Vaux* and the *Système Thuasné* from the inventors' names. The English varieties of this system are well known; we may mention the floors of Messrs. Measure, Moreland & Son, Shaw, Phillips, &c. Recently a better and more effective plan has been introduced, in which the iron is limited, and the concrete is made to take the position of the upper flange to resist compression, iron bars or plates being introduced as tensile members in the lower part of the beam or floor. Hyatt's system, in which Portland cement concrete is combined with iron bars, illustrates this plan (see article in BUILDING NEWS, last vol.). In some other instances the iron beams have been encased in earthenware tubes, and the intervening spaces constructed with fire-bricks, joggled together, as in Hornblower's patent. In all the recent and most improved systems the objects have been first to lessen the amount of iron, and secondly to immerse it so completely in concrete as to protect it from the action of fire. In columns the same object may be accomplished by earthenware or terra-cotta tubes, or a casing of plaster.

FIXTURES,

A term applied to articles affixed to the land directly or indirectly so as to become part of the freehold. The nature and degree of annexation must be taken into account in distinguishing a landlord's from a tenant's fixture. In the "Architectural Dictionary" landlords' fixtures are defined as things necessary for tenantable occupation, and tenants' as those desirable for simply personal and individual convenience. Those things fixed by a tenant for trade purposes or profit have been ruled to be removable. Such fittings include bar-fittings, brewing vessels and coppers, pipes, cisterns, counters, desks, drawers, furnaces, gas-pipes, glass fronts to shops, pumps, shelves, blinds, machinery, &c. Erections for the purpose of agriculture have not had this right extended to them, though by a recent Act the tenant can, by agreement with the landlord and a month's notice before expiration of lease, remove such things and erections as may be taken away without injuring the freehold. Among ordinary house fixtures held to be removable by the tenant are baize doors, baths, bells, blinds, ornamental chimney-pieces, coppers, cupboards temporarily fixed, furnaces, finger-plates, gas-fittings, grates, hangings, and wainscot when fixed temporarily, hat-rails, ovens, sheds if not attached to other erections, &c. The degree of annexation must be taken into consideration also if the fitting can be removed without injury or loss to the freehold. Conservatories, partitions, doors, dressers, hearths, windows, locks, &c., are held not to be removable. There is an important distinction between things fixed by nails and screws, the former pertaining to landlords' and the latter to tenants' fixtures. We refer the reader to "Grady on Fixtures;" also articles in BUILDING NEWS.

FLAMBOYANT.

(Fr. *Flambeau* a torch.) The name given to the later Gothic or tertiary style (*ogive tertiale*) of France, contemporary with the Perpendicular of England. De Caumont assigns it the 15th and early part of the 16th century. Besides the curvilinear and flame-like form of the window tracery and panelling, the mouldings are chiefly composed of hollow, ogee, and roll members, but have few fillets, and there is an evident weakness apparent in them. Mouldings are also continuous without impost members or separation. Sometimes the mouldings interpenetrate. As Parker observes, the effect of the mouldings is generally tame.

"C. A. G." sends the following notes:—The French antiquaries have given the name of Flamboyant to the later Gothic of France, contemporary with the Perpendicular in England. The usual and leading characteristic of the Flamboyant style is found in the wavy flame-like forms of the tracery in the windows, from which it takes its name. It has many features in common with our Perpendicular, although at first sight it differs so much from it. The frequent use of pendants in the place of bosses, and of continuous mouldings round the arches and sides of the windows, with the absence of shafts or capitals, are common to both styles. In the French style we also commonly find the pillars without capitals, the mouldings of the archivolt dying away into the pillar, or sometimes continued to the base (for the pillars and the mouldings in the jambs of doors or windows commonly have bases though no capitals). The crockets are larger and more distant than in the Decorated style, and are also more spreading and flat, not so much like round knots as in the Perpendicular. The porches of this style are very large, rich, and elegant, frequently occupying the space of one of the side chapels, the outer arch fringed with open-work hanging from it in a very elegant manner, the doorway divided into two smaller doors with flat arches over them, and the doorway plane above them filled with sculpture.

"C. P. E." cites as examples:—Doorways at Cologne, St. Germain l'Auxerrois, Harfleur, &c. Arches vary much in form, from equilateral to flat three-centred. Mouldings of pier arches frequently die into the column without any cap or abacus to mark the line of springing, and in some cases continue down nearly to the ground, where they are stopped by small bases, similarly to our own Perpendicular. Battlements are almost unknown in this style. The parapets of open work are generally of very rich character. The Flamboyant style did not die, but merged gradually into the Renaissance, and many of the examples of this mixed style present "very picturesque combinations and striking effects." An instance of this may be seen in the church of Vetheuil, illustrated in the BUILDING NEWS on Dec. 22nd, 1876, and another (Domestic), illustrated on Jan. 5, 1877. The same journal gave some domestic examples of Flamboyant architecture (Bruges) Jan. 21, 1876.

FLANGE,

The projecting members of an iron beam. The term is applied also to the projection round the edge of metal pipes or columns, cylinders, &c., to admit of screw or bolt fastenings. Confining ourselves to the first definition, the proportion Mr. Hodgkinson found to give the best result for flanges of cast-iron beams was when the sectional area of upper flange was *one-sixth* that of the lower flange. This result agrees with the relative resistance of cast iron to compression and extension. In wrought-iron beams the flanges are generally made equal, particularly in rolled joists, and the flanges have a taper section on each side of web. Mr. D. K. Clark gives the mean thickness of ordinary rolled joist flanges at from 1-19th to 1-10th of depth. In wrought rivetted beams the upper flange is often made of larger area, or curved to prevent buckling. We consider the upper flange requires to be the strongest in wrought iron. (See works of Hodgkinson, Fairbairn, Rankine, D. K. Clark, and various articles in BUILDING NEWS. See art. "Girder").

BOOKS RECEIVED.

The Great Industries of Great Britain (Cassell, Petter, and Galpin,) is the first volume of a very handsome and important serial work. The subjects—which are in every case dealt with by competent writers—are sufficiently indicated by the title. Those which treat on "Health and Disease in Industrial Occupations," and "Industrial Legislation," are especially worth reading. The illustrations throughout are well-chosen, well-executed, and numerous, and the work altogether is decidedly above the average. *Health Primers* (London: Hardwick and Bogue) are doubtless meant to do good, but if the rest of the series are not more carefully edited than "The House and its Surroundings," the result will not be satisfactory. We are told, for instance, on p. 22, that, to keep out damp, "walls should be built double, with an interspace, *strengthened occasionally by cross-ties of brick.*" Again, on p. 19, the old mistake is made of stigmatising "all clay soils as invariably damp and unwholesome," in apparent obliviousness of the fact that, given other proper conditions, a clay foundation may be a much better one than one of gravel. The chapter on "Ventilation" is very inadequate, and that on "Warming and Lighting" scarcely less so. The contributors to this series seem more at home in connection with medical subjects. The three other treatises to hand—viz., those on "Alcohol," "Exercise and Training," and "Premature Death"—are better than the first, which might with advantage have been submitted to an architect or practical sanitarian for revision. *The Magic Lantern Manual*, by W. J. Chadwick (London: F. Warne and Co.), is a seasonable treatise on a good subject. We know the author is held in good reputation by the readers of our contemporary, *The English Mechanic*, on matters connected with this interesting instrument, and have no doubt many will eagerly avail themselves of the aid of his practical experience. *The British Almanac and Companion for* 1879 (The Stationers' Co.) bears the usual resemblance to its predecessors. *The City Diary*, 1879 (London: W. H. and L. Collingridge), is issued for the sixteenth time. It is as useful for ordinary purposes as any other diary published, and contains much information about City matters not given in any other similar publication. Hence, it is useful not only to City men, but to all who want to know anything about City matters. *Sprague's Pocket Diary and Architects' and Surveyors' Memorandum Book for* 1879. Messrs. Sprague and Co., of 22, Martin's-lane, E.C., have just issued a new edition for 1879, of their pocket diary, containing their well-known "Tables," &c. The present edition has undergone thorough revision, under the editorship of Mr. E. Wyndham Tarn, M.A., author of "The Science of Building," and other well-known works. In the "Tables of Measure," on p. 31, among other corrections, we find the true lengths of a degree of latitude or longitude is given, and with the "Table of Links" reduced to feet and inches. On p. 32, a simple rule is added for converting links into inches, and vice versâ. Under the heading of "Sundries," on p. 33, several new items of weights have been inserted. On p. 34 we find tables of all the different "French measures compared with English," which have been made more complete by the addition of some French measures of solidity, which were omitted in previous editions. The "Tables of Weights of Stone," and "Sundries," on p. 35, have been revised and enlarged by addition of the weights of other materials of importance to the builder. On p. 36 and elsewhere, much new matter has been added, and generally the value of this handy and accurate pocket companion is enhanced. The *Professional Pocket Book* (London: Waterlow and Sons, Limited), which is published under the direction of Sir Julius Benedict, is a most useful daily and hourly engagement diary—the only one, so far as we know, thus arranged.

The *Ecclesiastical Art Review* expects, early in January, to hear of the inauguration of a new Art Society. Its members will be made up from the ranks of the rapidly increasing number of decorative artists, who seem to have been sadly overlooked by all the existing societies. Several of the best known artists in stained glass and mural decorators are amongst its supporters.

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ILLUSTRATIONS.

RUINS OF DUBLANE CATHEDRAL AND SWEETHEART ABBEY—HOUSE AT CAMBRIDGE—NEW VESTRY HALL, KENSINGTON—DETAILS OF THE NEW NATURAL HISTORY MUSEUM.

Our Lithographic Illustrations.

HOUSE AT CAMBRIDGE.

At Cambridge several houses are being built at the backs of the colleges. We give an illustration of "St. Martin's," recently completed by Mr. W. M. Fawcett for the Rev. C. E. Graves, of St. John's College. It is built with red bricks, the dressings being rubbed, and the copings finished with red stone. The internal fittings are all finished in the same character as the main building.

KENSINGTON VESTRY HALL AND OFFICES.

We give a perspective view and ground and first-floor plans of this building, now in course of erection from designs and under the superintendence of Mr. Robert Walker, F.R.I.B.A., architect, of 10, King's Arms-yard, Moorgate-street, London. The foundation stone of the new building was laid by Lord Kensington on Thursday, December 12th. The principal entrance to the building is in the centre from High-street, Kensington, but there is also a separate entrance to the large hall from Church-passage at the side, and back entrance for the housekeeper, inspectors, &c., from Church-court in the rear. The front right-hand portion of the ground floor is devoted to the vestry clerk's department, and comprises vestry clerk's public and private office, accountant's office, waiting-room, and strong-room for daily use; a separate stairs leads to the basement under same, in which are provided large fireproof rooms and spare offices. The surveyor's department is on the opposite side, and comprises general office, drawing office, surveyor's private room and room for papers, &c., and a separate fireproof room is also situated in the basement under these offices. The medical officer's and sanitary inspector's offices are placed in the rear of building, and the large committee-room, 56ft. long × 30ft. wide, is also in the rear, next Church-court, but entered from the central hall; a separate waiting-room and lavatory is connected with this. The first floor comprises the vestry hall, 92ft. long × 45ft. 6in. wide, entered from the grand staircase; at the east end is the platform, and a gallery is placed at the west end, approached by a separate staircase and entrance from Church-passage. The vestry hall is 32ft. high; adjoining the east end is the anteroom and separate staircase from ground floor to platform. A second large committee-room, 56ft. × 0ft., is placed over the one below, and on the opposite side of the staircase is a sub-committee-oom. The basement is used as spare offices, itchen for housekeeper, fireproof rooms, lavatories, &c. The housekeeper's living and bedrooms are on the second floor at the north-west angle of the building, and a laboratory for the analyst is also provided on this floor. The contract is being carried out by Messrs. Braid and Co., of Manor-street, Chelsea, the contract for the works being £30,400. The working drawings as originally prepared by the architect, and the tender as given by Messrs. Braid and Co., only included building on the site as originally dealt with in the architectural competition; but upon the works being commenced the owners of the two houses in Church-court, who had till then refused to sell their property, offered to come to terms; the vestry bought these houses and enlarged the site, and fresh drawings were accordingly prepared by the architect, Messrs. Braid and Co. agreeing to do the extra work at the same prices as in their original contract. The elevations and general plan of the buildings are substantially the same as those which were successful in the competition, but, the site having been enlarged to the extent of about one-fourth, the two large committee-rooms and considerable additional accommodation have been obtained. The whole of the principal front and side of the building is being carried out in Portland stone, the small columns being polished grey granite.

DUNBLANE CATHEDRAL AND SWEETHEART ABBEY.

New Abbey, or Sweetheart, is situated about seven miles from Dumfries, founded in 1275 by Devorgilla, mother of John Baliol, King of Scotland, in memory of her husband, John Baliol, of Bernard Castle; hence the name Sweetheart. It occupies a picturesque site. The sketch shows chancel end. Dunblane Cathedral, of which we give the west front, is situated in Stirlingshire, a few miles from the town of Stirling. It is of the Early English period, though there are portions of earlier date. The west door is very beautiful, but much dilapidated. Both drawings are by Mr. Wm. Ferguson, of Glasgow. An elevation and details of the west front of Dunblane Cathedral appeared in the "Sketchbook Series" in the Building News for May 20th, 1870, and the nave arcade, and south façade in the same series, Oct. 14th, 1870.

NEW NATURAL HISTORY MUSEUM.

This double-page plate gives the general working details of the grand entrance to the new Natural History Museum. For details of the enriched parts as well as figure panels and frieze, we refer our readers to the Building News for Nov. 8th, where they will be found illustrated from sketches made from the work itself. The drawing to-day explains itself, while its position both on plan and elevation will at once be seen from the general perspective view and plan which we hope shortly to give. Next week a double-page plate will be devoted to enlarged sketches of the big animals between the dormers of the principal façade and some gurgoyles. Mr. Alfred Waterhouse, A.R.A., is the architect.

SCHOOLS OF ART.

Northampton.—The annual meeting of the Northampton School of Art was held on the 4th inst. Mr. Hill, the head-master, reported that the school now stands in a higher position than it did this time last year with regard to the results of the examination of the works at South Kensington, a greater number of students having gained prizes for works in the advanced stages, particularly that of design, than in any previous year since the school was first commenced. Three students gained prizes for original designs of muslin curtains, three for original designs for wall papers, three students for designs to fill a given space, one for modelling and casting from a drawing, and one for a group of flowers from a copy. The school was attended last year by 202 students; 124 sent 1,050 works to South Kensington for examination. At the May examination in free-hand, geometry, model, and perspective, 41 were successful; nine obtained prizes for excellence in those subjects.

York.—The annual meeting of the subscribers and members of this institution was held last week. The report stated that the number of students who have availed themselves of the instruction offered by the school has been 135. Of these 11 presented themselves for examination in model drawing in the second grade, 5 being successful, and 2 being marked "excellent." Twenty presented themselves for examination in freehand, of whom 13 were successful, and 2 were marked "excellent." In geometry there were 9 candidates, 2 being marked "excellent." In perspective there were 5 candidates, of whom 4 passed, 2 being marked "excellent." These results show a total of 24 passes (8 being marked "excellent") as against 21 passes and 5 "excellents" last year. In the third grade five prizes have been awarded; two students have gained the third-grade art certificate of the first group; one has passed in advanced perspective; and one has been awarded a free studentship. In the early part of the present year the committee determined to offer a number of local prizes to the students, under certain regulations, which were intended to secure a fair and real competition; and they are glad to be able to report that the results have been very satisfactory.

COMPETITIONS.

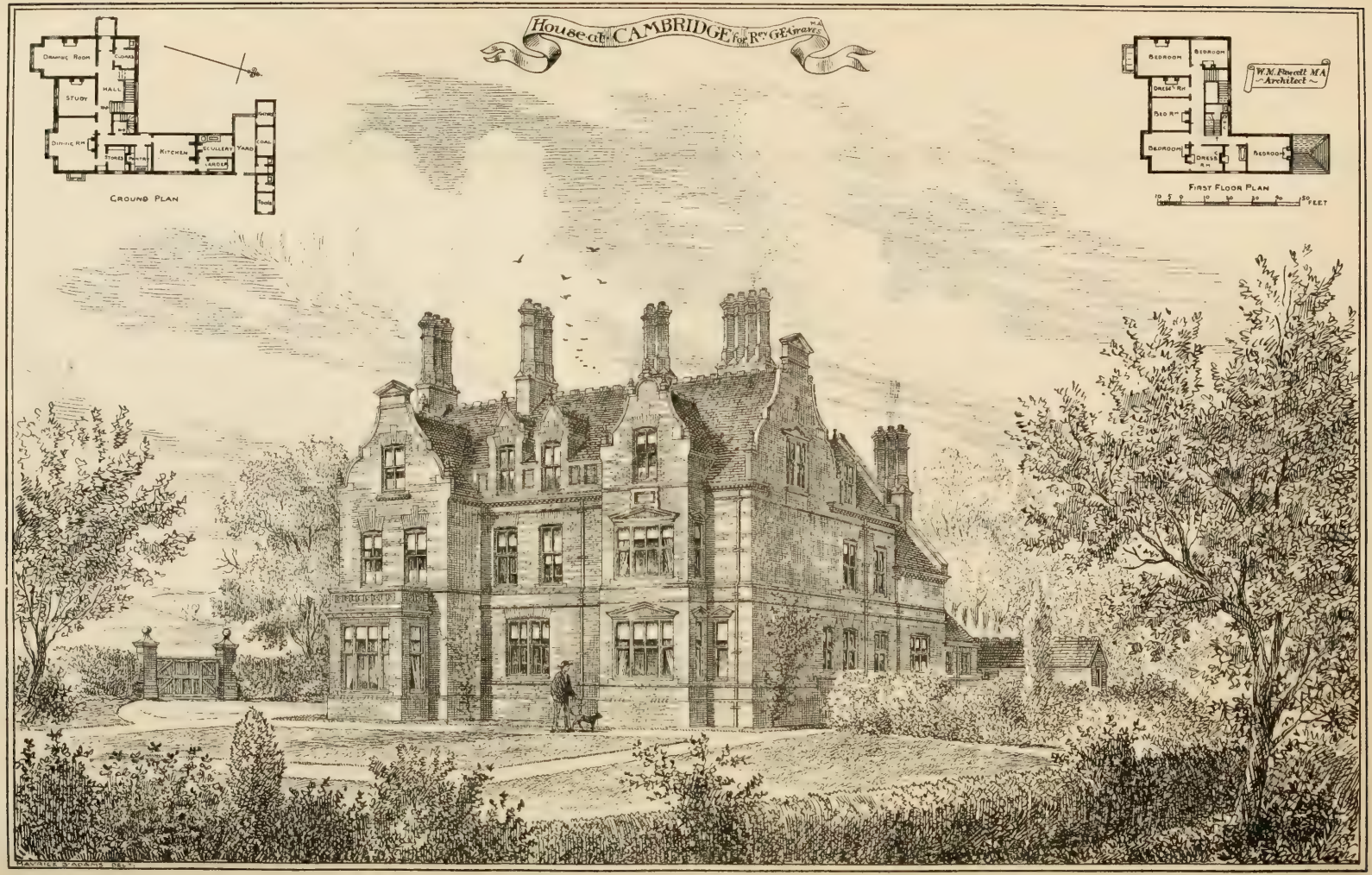
Ross.—Mr. F. Lennox Canning writes us as follows:—"In the article of the 'Ross Cottage Hospital' competition in your last number, the author of the design 'Thorough,' adjudged second in merit by the committee, is stated to be Mr. Gordon Lennox. This is an error. The design under that motto was submitted by me. I shall be obliged if you will suffer this correction to appear in your next issue."

ARCHÆOLOGICAL SOCIETIES.

British Archæological Association.—The second meeting of the session was held on Wednesday last, Mr. Thos. Morgan, F.S.A., in the chair. Mr. Syer Cuming reported the discovery of ancient relics on the site of the Fleet prison, and Mr. May exhibited some interesting objects found in London. Dr. Stevens described a portion of the Roman-road, the Portway near Andover, now being removed. It is 25ft. wide, and formed wholly of flints, closely compacted. Mr. Loftus Brock, F.S.A., exhibited some 16th century pottery, from the site of Mercers'-hall, Cheapside, where the road is being widened, revealing a portion of the foundations of the chapel of St. Thomas-a-Becket. The Rev. S. M. Mayhew described some perfect articles of Roman date from Seething-lane, &c., and a tile from York, bearing the stamp of the 9th legion. Mr. Worthington Smith exhibited a large prehistoric flint implement picked up by him on a road at Ealing, which had been recently gravelled from a neighbouring pit. The first paper was read by the Rev. S. M. Mayhew, who described at length the important Roman remains recently discovered at Lincoln. These consist of portions of two colonnades at right angles, the columns of one being 2·6 in diameter, and the other 2·9. Only one column remains of the second row, and this has the remarkable peculiarity of being coupled with the adjacent one of a smaller size. The moulded bases and about 14ft. of the shafts remain. These discoveries have been made by Mr. Allis, and are about 9ft. below the present surface. Mr. Loftus Brock pointed out that the columns must have been about 25ft. high, but from their distance apart—about 13ft.—it was probable that the architrave above was of wood, a remark justified by recent discoveries elsewhere. A resolution was passed, calling the attention of the local authorities to the interest of these discoveries, and the importance of preserving them. The second paper was by the Rev. Dr. Hooppell, of Byers-green, who took for his theme the 10th Iter of Antoninus, and proposed a new reading of its course, and Tynemouth (Tunnocellum) as its starting point. The third paper was by Mr. Romilly Allen, who described the singular cut circles on the rocks at Ilkley, where they are found in considerable numbers. The whole subject of these prehistoric objects was dwelt upon, and also the common resemblance of those in Scotland, England, Wales, Ireland, the Continent, Asia, and America. The paper was illustrated by a great number of drawings, including some of newly-discovered examples.

The parish church of Helland, Cornwall, was re-opened last week after restoration at a cost of £1,200, from the designs of Mr. J. P. St. Aubyn. Mr. W. May, of Pool, near Camborne, was the builder.

All the south walls at Welbeck Abbey (the seat of the Duke of Portland) have been covered with glass on Rendle's patent system, more than 1,200ft., in length, enclosing an area of about two acres for protecting and growing strawberries.



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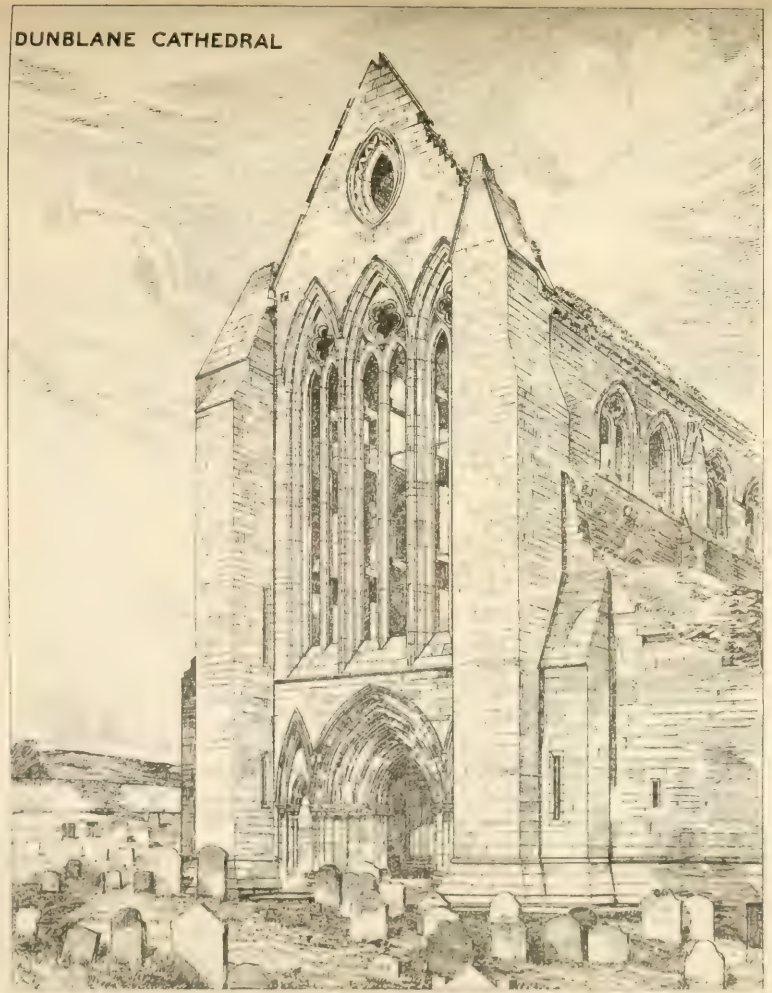
DUNBLANE CATHEDRAL

SWEETHEART ABBEY

ENGLISH AND FOREIGN WORKMANSHIP.

We have received a copy of a pamphlet just published, containing the reports of the artisans deputed by the Liverpool committee to visit the Paris Exhibition for the purpose of reporting upon industrial exhibits. The reports include the following trades:—Bookbinders, boot and shoemakers, breadmakers, cabinet-makers, coopers, engineering pattern-makers, gilders, letterpress printers, rope-makers; and we may with some profit scan over those relating to subjects of interest to our readers, remarking at the same time that the opinions expressed have reference chiefly to workmanship and not design. We refer to the report on cabinet-making, signed by "Thomas C. James," the delegate representing that industry. The writer, after examining the English, Canadian, American, Italian, Austrian, and Belgian sections, was convinced that the "cream of the cabinet furniture exhibits lay between the French and English sections." Liverpool was not represented at all, though possessing "firms capable of manufacturing the finest class of cabinet work." Of the exhibits the report speaks very highly of the work sent by Mr. James Lamb, of Manchester, which for "perfect finish and art is not to be equalled by any other exhibitor;" but besides Manchester, Croydon, Leeds, Lancaster, Edinburgh, and Kirkcaldy contributed work. In alluding to the French cabinet work the author speaks doubtfully of the *interior* workmanship, for he says the prohibition "not to touch" prevented a careful examination of this part, and he adds, "this was unfortunate, as previous French work I had examined, although well finished on the outside, had been badly finished inside. To please the eye seems to be Frenchman's general maxim." Externally the French work is pronounced equal to the generality in the English section, some of the specimens being remarkably finished in detail, while the designs were more varied than the English. The chief material used is walnut, whereas in the English section it is oak. The report goes on to remark upon the system of working and payment adopted in some of the Paris workshops, especially those belonging to the Continental branch of the Alliance Cabinet-makers' Association. The system of working in the majority of workshops is by the piece, and the wages are paid at different intervals, some weekly, others fortnightly or monthly. The report goes on to say the prices paid are much above Liverpool prices, but the work takes longer, and the activity displayed by the workmen is said to be less than that at home. Polishing is done well, but the machinery in use is not spoken of with satisfaction. Speaking of the French workmen's social condition and mode of living, the writer compares the Englishman's home favourably. The French workman lives practically out of doors, and cafés are his chief resort in the evening. In concluding, the report states there are no middle-men in Paris; manufacturers who sell their own made work are patronised, salesmen and jobbing cabinet-makers are not favoured, and slop-work generally is discountenanced.

The remarks on "Engineering Pattern-makers" refer to the superior finish of French patterns compared with our own, but show they are not so strongly put together for the purpose. The patterns are not made in halves for the convenience of moulders, as our patterns are, and it is stated that an ordinary British workman can do in seven hours as much as an ordinary Frenchman can do in ten hours. Wages of pattern-makers are 40 francs per week of 60 hours, or 7 francs per day, and piecework is not general. Fitters work by the piece, and earn from 11 to 12½ francs per day of 11 hours, and at day work from 6 to 8 francs per day. Mr. Thomas winds up by passing a tribute of praise to the working class of Paris as steady and industrious, and mentions that there is a school for instruction in mechanical engineering, established by the Commune and continued by M. Thiers' Government. At the expiration of three years the lads go out as improvers at wages of from three to four francs per day.

Referring to another report on "gilders," Mr. Fothergill alludes in high terms to the elegance and taste of the various French exhibits, the excellent workmanship; the chandeliers, vases, timepieces, &c., in this branch are said to be of the highest order. In English furniture Messrs. Gillow and Co.'s pavilion is mentioned as one of the most striking objects, and Messrs. Marsh and Jones, of Leeds, for a richly-carved and well-executed sideboard. Piecework does not exist in this branch in any of the best French establishments, and wages are for males 6½ and for females 4½ francs per day. The writer remarks upon foreign importations, such as German mouldings for picture frames and cornices, and their injury to home trade, though as spurious imitations they are unsatisfactory. Of the causes assigned for the alleged deterioration of English workmanship, three are named—1st, the tendency on the part of the public for cheap goods and ruinous contract jobs; 2nd, close and unprofitable competition on the part of shopkeepers; and, 3rd, foreign competition.

ARCHÆOLOGICAL DISCOVERIES IN ST. JUST AND SENNEN.

At the recent annual conversazione of the Royal Institution of Cornwall, the president, Mr. W. Copeland Borlase, read a paper entitled "Archæological Discoveries in the Parishes of St. Just-in-Penwith." A cursory glance at the map of Cornwall will suffice to show that the western sea-board of the county properly so-called consists of a small piece of jagged coast-line (five miles in length as the crow flies) extending from Kenidjack Castle, in St. Just, to the Land's End. Beyond these headlands the cliffs in each case take an eastward turn, so that the part that lies between them is that which may be said to face most directly westward. The coast is indented by deep valleys made all the deeper by ancient tin streams, and it results from this and from the nature of the cliffs themselves, that "karns," as they are called, stand out often to a considerable elevation. Of these karns there is scarcely one which does not bear, either on its summit or on its downs close by, an artificial cairn or tumulus of stone, or the traces of one having existed there in former times. In this same range of cliff there are besides no less than four cliff castles, those of Maen, Ballowell, Cape Cornwall, and Kenidjack. Close to the rampart of the last-named were found some remarkably fine celts and other antiquities, together with 20 or 30 pieces of pure copper. At Cape Cornwall, where there are traces of a cliff castle, a large urn was discovered some time since but re-buried; and although Mr. Borlase's search for it was unsuccessful, he found broken pottery and the ground strewn with charcoal flints. This was in the "castle" trench, and in the same trench was found a small cist, 2ft. in length, but perfectly empty. Rising to a much greater height than Cape Cornwall rise the Ballowell cliffs, and in their vicinity remains of great interest and value have previously been found by Mr. Leatham, the tenant. It was here that Mr. Borlase's great discoveries were made. On the very summit of the promontory the St. Just Amalgamated Mines have thrown to the surface an immense pile of refuse, and in one spot in the midst of this his attention was called to the fact that the pile consisted, not of stuff from underground, but of surface granite stones, and this turned out to be the truncated remains of a large tumulus. Laid bare on the western side a wall was discovered, formed of massive granite stones, and now about four feet high, with a bulge in an easterly direction. Within this outer circle, at a distance of 18ft., is a second wall, resting like the former on the unmoved ground, and surrounded at its base by ashes and charred wood. This wall proved to be 11ft. in height. On breaking through this wall at a distance of 5ft. 6in. within it a third wall appeared, built in the form of a beehive, the space between being filled with large stones. The whole tumulus, it is calculated, had a diameter of 260ft. to 300ft. After comparing the shape and structure of this building with some buildings in other lands, notably in India and Afghanistan, Mr. Borlase went on to describe the contents of the inner cone. At its centre a pit or grave was discovered, in shape like the letter T, lying in a direction N.E. and S.W. A surmise that this pit was the result of mining operations proving groundless, further search was made. At the bottom was a quantity of black greasy earth, mingled with ashes, and a bed of micaceous matter. Proceeding to clear up the floor of the tumulus as far as the inner circle, the explorers found no less than five neat little stone cists, all standing on the south and south-west sides, and in which were found urns, fragments of pottery, ashes, and some minute particles of burnt bone, whilst on a superstructure was a sixth cist, empty save for a few fragments of well-baked pottery. The position of the tumulus, on what was anciently considered to be the most westerly point of Cornwall, and the position of the cists facing the west opens the question whether there is any reason for thus placing them? The superstition about not burying on the northern side of a church seems to arise from the same cause; and he (the President) thought we should not be wrong in regarding such grouping of cairns and the building of this immense tumulus on the highest point near the westernmost cape as relics of, if not a solar worship, a superstition connected with such a worship. The west has been the "Death quarter" in all ages, and well-nigh in all mythologies, and it may be that, with the object of bringing their dead as nearly as possible to the spirit land, our western rocks are crowded with these tumuli. Several other cairns were opened by Mr. Borlase with equally satisfactory results. They were rich in urns cinerary beyond all doubt; in ornaments and fragments of domestic pottery, in flint implements, and even a small bit of glass—differing in colour and thickness from that previously discovered in Plymouth and elsewhere. We have only space just to glance at them. On Boscregean farm (which derives its name from the "cregs" or tumuli) were found the remains of a tumulus, containing fragments of certainly not less than seven sepulchral urns, one of which could not have been less than 22 or 23in. high when perfect. Adhering to the interior of this large urn was a quantity of burnt human bones, intermingled with charcoal and ashes. The karn where these remains were found is called Carn Leskys. Karn Cresis (Cornubice, "the middle karn") lies 150 paces to the south of it, and here were found the third and fourth karns explored on the Boscregean estate. In one of them was a cist, lying east and west; and fragments of pottery, beads, and other relics. To the south and south-west of the cliffs on which these cairns are situate there are evidences of early habitation in the plots of ground and terraces artificially levelled in the sides of the cliff, and hedged in with banks and upright stones. At Escalls, in the parish of Sennen, was a carin surrounded by a double ring of stones, one side of the area of which was taken up by a natural rock protruding through the surface. On the southern side a large rock covered a little cist, in which nothing was discovered but a few flint chips and two limpet shells. Outside the grave, however, at its southern end, was a little urn, standing mouth downwards. A few days afterwards the president opened three cairns at Maen in Sennen, thus completing the exploration of the cliffs of West Cornwall. In one fragments of a large urn were found, together with flints, pebbles, burnt bones, and charcoal. In conclusion the President said: Allow me to observe that the results of a few days' researches in a very limited tract of country in Cornwall are sufficient to justify the belief that much yet remains to be done to illustrate the unwritten history of the county, and that not alone in tumuli which seem to be intact, but in those also which may have been previously denuded for other purposes than those of archæology.

The Walton Local Board have selected and purchased an area of half an acre in Brownedge-lane as the site of new offices. Messrs. Myres, Keevers, and Myres are the architects.

The parish church of Hornby, Leeds, was re-opened, on Wednesday week, after restoration. The old gallery has been removed, and an organ chamber and vestry erected. The contractors for the carrying out of the whole of the works are Messrs. Shillitoe and Morgan, builders, of Campsall, near Doncaster, the architect being Mr. J. L Pearson, of 46, Harley-street, London. The total cost of the restoration has been £6,000.

Building Intelligence.

Felsham, Suffolk.—This church was re-opened after the restoration and re-seating of the nave on Dec. 1st inst. The old western gallery has been taken away and the tower arch opened to view, which makes a great improvement. The amount of money spent is about £500, raised by public subscription. Mr. Herbert J. Green, architect, of 24, Lincoln's-inn-fields, London, supplied the designs. The building has been carried out by Mr. Hawkins, of Monks Eleigh, Suffolk.

Inchicore.—The new Catholic church of St. Mary the Immaculate, at Inchicore, was dedicated on Sunday. The plans provide for a nave, transepts, chancel, and four side chapels, but at present the nave and chapels only are built. The style is Decorated Gothic, and the materials are Dalkey granite ashlar for external facing, with Portland Sturton stone dressings. The nave is divided from the aisles by columns of polished Aberdeen granite, with Portland caps and bases. Above the arcades of six bays on either side are ranges of clerestory lights. The ceilings are sheeted and panelled, except that of an apse, which is groined. In each side chapel is a rose window over the altar, and a large wheel window will occupy the centre of either transept. The western gable contains an eight-light traceried window; beneath is the principal entrance, the tympanum of which will be filled with a sculptured representation of the patroness of the church. On each side of the west front is the base of a turret to be eventually each capped by a spire 104ft. high, and to contain bells. Mr. Ashlin, of Dublin, is the architect. The work at present executed has cost about £8,300.

Liverpool.—The new Rotunda Theatre, Liverpool, which is to be opened on Friday next, has been reconstructed from the designs of Mr. C. J. Phipps, F.S.A., in conjunction with Messrs. E. Davies and Son, of Liverpool; Messrs. Haigh and Co., of Liverpool, being the general contractors. The ground floor of the building comprises a tavern and café, and also billiard-rooms, with seven tables; and there are six American bowling alleys in the basement. The entrances to the theatre (the pit of which is on the level of the first floor) are at the extreme back. Every staircase has a solid brick wall dividing the flights, and there are three distinct and separate staircases, so that each division of the audience has at least two means of egress in case of need. This is irrespective of the two staircases in the proscenium, both of which communicate with the highest level down to the street. The seating capacity of the theatre is estimated for about 2,000 persons, but the space in every part of the building for those who choose to stand will make it capable of holding about 3,000. The plan is adopted of having all the walls of the gallery lined with glazed bricks, alternately white and red, combining great cleanliness with ornamental decoration. The ceiling and the two tiers of box fronts and proscenium pillars have been manufactured by the patentees, Geo. Jackson and Son, of Rathbone-place, in their fibrous plaster, and ornamentally painted and decorated from the designs of the architect. The stage opening is 24ft. wide by 30ft. high, and the ceiling is 38ft. above the pit floor. The stage is 32ft. deep from the curtain line to the back wall, but a large room at the back of the stage allows of scenic effects being shown to a depth of 44ft. The height above the stage floor is 44ft., and the depth below sufficient to admit of an entire scene being lowered out of sight. Over the whole building is a high Mansard roof, covered with a lead flat, upon which are arranged seats and alcoves in the various towers, and a camera obscura in the Rotunda tower.

Metropolitan Board of Works.—At this board on Friday a cheque was drawn for £451 5s. in favour of the Whitechapel district board, being half the net cost of an improvement at the corner of Royal Mint-street and Leman-street, Whitechapel. The finance committee stated, with reference to the letter from the vestry of St. Luke, requesting an advance of £59,000, in respect of the Golden-lane improvement, or permission to borrow that amount, that having regard to a report of the works and general purposes committee, approved by the board on the 15th Nov. last, the committee were not at present prepared to recommend the board to make the advance applied for, or to sanction the vestry borrowing the money; and calling the attention of the board to the fact that the sum of £14,000, which the board authorised the vestry to borrow as a temporary loan, and which was directed to be repaid out of the loan of £79,000 subsequently raised by the vestry, had not been repaid.—Mr. Storey, the representative of the vestry, appealed to the board to grant a loan, as its withholding it would cause great legal difficulties and delays and expense, and alleged that the vestry had purchased land as cheaply as possible.—Mr. Richardson said if the vestry wished to regain the confidence of this board, Mr. Storey and the other members who had dealt in the land in question ought to resign, and present themselves to their constituents for re-election. The recommendation of the committee was adopted. £7,000 is to be advanced to the overseers of St. Anne's, Limehouse, for the purpose of erecting parochial offices. For improvements proposed to be carried out by the Chelsea vestry, the following sums, being moieties of the estimated cost, were voted:—Widening of King's-road by acquiring portions of forecourts of Ashburnham and Cremorne gardens and Ashburnham-park nursery, £650; ditto, by acquiring portions of Nos. 289 and 289A, King's-road, and Paulton's-square garden, £65; ditto, acquiring portions of Nos. 149 to 165, King's-road, £240; and widening of Lot's-road, £60.

New Jerusalem Church, Kearsley, near Manchester.—This church, which will seat 750 persons, the gallery accommodating 300, is faced throughout with Kerridge parpoints, and the whole of the dressings are of Alderley stone. The nave arches, supported by iron columns, are of buff and brown bricks; the walls are plastered; and the roof is open and lighted by four clerestory windows. The chancel, divided from the nave by a lofty arch, is octagonal, and lighted by three traceried windows, and the floor is of mosaic. All the glazing is in lead lights, with quarries of various tints. The internal woodwork is of pitch pine, with baywood in the seat ends, pulpit, &c. The total cost, including the spire, which is not yet completed, will be about £6,800, or a little more than £9 per sitting. Mr. G. Napier, Manchester, was the general contractor; and the whole of the work has been designed and superintended by Messrs. Colley and Beaumont, also of that city.

Penzance.—A good deal of work is in hand round about Penzance and in its vicinity. The new railway station slowly advances, giving work to about 40 persons. Messrs. Vernon and Evens, of Cheltenham, are the builders. The docks and the proposed new road from Alverton to the Western Esplanade only await legal formalities and Government approval. The large Bible Christian chapel in Taroveor-lane, the foundation stone of which was laid a few months ago, is completed as far as the walls and roof are concerned, and Mr. Henry Carne, the contractor, is pushing on the woodwork of the interior. Paul has commenced its new Board Schools (Mr. Henry Carne, carpenter; Messrs. Dustow and Sons, masons). Newlyn, which is also in Paul parish, commences very shortly an addition to its Wesleyan day and Sunday schools, the plans for which have been prepared by Mr. John W. Trounson. The same architect has drawn plans for a mortuary chapel at Lelant, the gift of the late Captain Perry. Mr. Philip Hurrell, of Lelant, who has been doing a good deal of work on the Trevethow Estate, has the contract for this. Masons of this neighbourhood are also engaged on a residence which is being built for Mr. Seymour, an artist, for which Mr. Trounson drew the plans. At Madron the commencement of the new girls' and infants' schools has been made. The contractors are Messrs. Trythall, Ford, and Gendall, and the estimated cost £1,000. Mr. Harry Hems, of Exeter, is executing the stone carving.

Sevenoaks.—The parish church of St. Nicholas, Sevenoaks, was re-opened on the 28th ult., after restoration. Mr. Ewan Christian, the architect, states that so far as he has been able to discover, no portion of the existing church was erected before about the middle of the thirteenth century, and the work that now remains of that century is in the pillars and arches of the nave. Portions of the walls of the north aisle, and part also of the chancel, might be of similar antiquity, but a great change or rebuilding was made in the former in the fourteenth century, and the interior of the chancel was entirely reconstructed in the fifteenth century, when also the present south aisles of the nave and chancel appeared to have been erected. The chancel has been completely stripped, the old plastered roof being removed and the bare walls alone left standing. These walls have been raised to the extent of 3ft., and on them has been placed an oak roof. The floor is laid with encaustic tiles, and into the design, in that portion within the sanctuary rails, there are introduced slabs of white marble bearing the emblems of the Evangelists and a representation of the patron saint. The steps for this part of the chancel are of red Devonshire marble. The eastern end of the north aisle is to be occupied by the organ. The chancel is separated from the nave by a neat dwarf wall of Bath stone, connected with the stone work of the pulpit, the old pulpit, which dates from the seventeenth century, being retained. The galleries, which were on three sides of the church, have been pulled down and the organ removed, with the effect that the tower, in which there is a very fine arch, and the west window, a very handsome one, have been thrown open. The stone pillars have been thoroughly cleaned and restored, where restoration was necessary, and the old and crumbling stones in the windows have been removed and renewed, a new chancel arch of stone replacing the former one of plaster. The church will be heated by hot water, and the arrangements for lighting by gas are by handsome brass coronas of sixteen burners each, suspended near the apex of each of the nave arches, there being five on each side. These are the work of Messrs. Jones and Willis, of London, and the brass work in the chancel has been executed by Hart, Son, Peard, and Co. The work has been carefully carried out by the Messrs. Punnett, builders, of Tunbridge, the cost, independent of the chancel, being about £2,300, so that, with the organ and chancel, nearly £5,000 will have been already expended on this restoration. The church, however, will not be completely restored without the addition of a clerestory to the nave, and the architect says of this: "Certain it is that externally and architecturally considered the church does, as it were, cry aloud for a clerestory."

York Diocesan Church Extension Society.—A meeting of this society, the first since the society commenced under its new scheme, was held on the 25th ult., and the following grants were made:—For new church at Eston-cum-Normanby, near Middlesbrough, £378; increase of accommodation at All Saints, Driffield, £128; increase of accommodation at Saltburn-by-the-Sea, £108 13s. 6d.; new parsonage at Burton Fleming, £150; mission-room at St. Mary's, Scarborough, £100; mission church at Wombwell, £100.

The Corn Exchange at Sittingbourne has been converted into a town-hall, with board-room, offices, &c. The hall will seat about 600 persons. The first section of the work was executed by Mr. J. Bligh, of Eastchurch, the amount of his contract being £176; and the second portion by Mr. George Pavey, of Sittingbourne, at £889. The architect was Mr. W. Leonard Grant, of Sittingbourne.

The new bishop's throne in St. Andrew's Church, Plymouth, was uncovered on Sunday. The throne, together with the new credence, is from the designs of Messrs. G. G. and J. O. Scott. The new works are strictly in keeping with the surroundings, and hence are of the Perpendicular type. They are the work of Mr. Harry Hems, of Exeter.

A new Catholic church is about to be built at Termonfeckin, county Louth, which will replace the present unsightly thatched structure. At a meeting of the building committee, held last week, the names of Mr. Ashlin, of Dublin, and of Mr. P. J. Dodd, Drogheda, were proposed for selection as architects, and on a division the majority of votes was for Mr. Dodd, who has been appointed.

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TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.]

All letters should be addressed to the EDITOR, 31, TAVISTOCK-STREET, COVENT-GARDEN, W.C.

TO OUR READERS.—We shall feel obliged to any of our readers who will favour us with brief notes of works contemplated or in progress in the provinces.

Cheques and Post-office Orders to be made payable to J. PASSMORE EDWARDS.

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The charge for advertisements is 6d. per line of eight words (the first line counting as two). No advertisement inserted for less than half-a-crown. Special terms for series of more than six insertions can be ascertained on application to the Publisher.

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Cases for binding the half-yearly volumes, 2s. each.

RECEIVED.—T. P.—M. and Co.—S. and S.—E. G.—G. T. M.—J. H.—J. B. P.—R. T. and Co.—E. P.—T. L. B. A. R. LETHBRIDGE. (We remember the tenders, but not the other matter. Possibly miscarried or overloooked. Send again.)

"BUILDING NEWS" DESIGNING CLUB.

LIST OF SUBJECTS.—1. A wayside inn, with bar, bar-parlour, smoking-room, and approach to bowling-alley and skittle-ground in the rear, with six bedrooms, and all conveniences. Stabling not to be shown, but a trough for horses in front to be provided. The style to be suitable to the country. Scale—8ft. to the inch.—2. A dining-room buffet in oak, suitable for a middle-class house, to stand at the end of a room 14ft. wide by 18ft. long. Scale—1in. to the foot, and ¼ full size details.

Owing to Christmas, we publish the subjects a week earlier than usual. Drawings of the above to be sent in on or before January 17th, 1879.

TO CORRESPONDENTS.—C. J. Killmister. (The designs for villas to be sent in by Friday next.)—W. G. Gower. (Your criticism suggests nothing new to us, and does not affect the general object of our class.)

DRAWINGS RECEIVED.—Cabul, M in Leaves, A. E. Calton, W. R., Benjn. Laurence, J. L. Canning, Gilbert Murray, J. J. S., J. and J. B.

Correspondence.

PROFESSIONAL PRACTICE AND ETIQUETTE.

To the Editor of the BUILDING NEWS.

SIR,—Some years ago, in consequence of a tradesman maintaining that he had a right to keep tracings of work executed for me, I presented a series of questions upon points of professional practice to the Institute, which were duly answered, but permission was refused as to making these answers public. Subsequently the permission was accorded, but I did not avail myself of it, as I hoped to bring the affair before an approaching congress, which I did, but with very doubtful result.

I again tried to do the same just before the late Congress, but was informed that I was too late, the subjects for discussion (corrosion of iron, model bye-laws, and the iron ribs of the Corn Exchange) having been already settled. I therefore gave up all hope, and resolved to let the affair rest until the next Congress, when, on the 12th of last month (my former letter being dated May 27th), I received the following communication from the secretary. To it I have appended my reply, with the addition of the closing letter from the secretary. I have now done all I can until the next congress affords me another opportunity. It is, however, possible that other Fellows may take my view, that the sooner these questions are answered, definitely and publicly, the better, in which case I shall be most happy to join them in requesting the council to call a special general meeting under section 14 of the bye-laws. The Institute has had some 40 years to think over the points in question, which I am presumptuous enough to think ought to have been settled at the very beginning, or, at least, within a year or two of the incorporation.—I am, &c., W. BURGES.

15, Buckingham-st., Strand, Dec. 9, 1878.

Royal Institute of British Architects,
9, Conduit-street, Hanover-square, W.,
November 12, 1878.

DEAR SIR,—Your letter and inclosure of the 20th May last was laid before the final meeting of the Conference (1878) Committee, and both were afterwards submitted to the Council, who referred the questions of Professional Practice and Etiquette, which you had formulated, to the considerations of the Professional Practice Committee. The answers proposed by the last-named to your questions were again considered by the Council at their meeting on the 4th inst., when the secretaries were instructed to send you the answers which you will find recorded below, in a line with the questions you have been good enough to put, thus:

1. Is the Architect to supply the Clerk of the Works or the tradesman with the set of tracings referred to in the Professional Practice paper of the Institute?

2. If he supply both the Clerk of the Works and tradesman an extra set will be required. Who is to pay for this extra set—the client or the tradesman?

3. Could the difficulty be solved by inserting a condition in the contract that the tradesman shall make his own tracings, to be afterwards inspected and signed by the architect?

4. Should not the clerk of works and the tradesman, after the work is finished and paid for, be obliged in all cases to return, not only the drawings and tracings furnished, but also any copies of the same which they have made for their own convenience?

5. Should orders of the Architect to the tradesman go through the Clerk of the Works only?

6. Is it consistent with the position of an Architect for him to advertise, directly or indirectly, in the public journals?

7. Is it consistent with the position of an Architect for him to apply for work or to offer his services to people not his personal friends?

8. Is it consistent with the position of an Architect for him to be connected with any trading firm in the profits of which he parti cipates, although his name does not appear?

In conclusion I have only to express regret, personally, for the apparent waste of time which has ensued since you first addressed me, and to remain, dear sir, your faithful servant,

(Signed) WILLIAM H. WHITE, Secretary.
William Burges, Esq.,
15, Buckingham-street, Strand, W.C.

15, Buckingham-street, Strand,
November 27, 1878.

MY DEAR MR. WHITE,—Pray allow me to acknowledge the receipt of your paper of the 12th ult. containing answers to the questions in my letter of May 20.

My object in that letter was to obtain their discussion, not only by the Council and Professional Practice Committee, but by the profession at large assembled in Congress. I sincerely hope that this may still be the case, and that in the next Congress these points may be placed on the programme for discussion. As regards the late Congress I had no notice that there would be any discussion at all on these subjects, as Mr. Cates's letter held out no hope of any such course.

I do not quite understand how to solve the question of the number of tracings required to be furnished by the architect. The Professional Practice paper tells us that the architect is bound to furnish *one* set of tracings, and that set is evidently to go to the builder according to the decisions contained in your letter of November 12. Then comes the question, who is to supply the tracings wanted by the clerk of the works? Is he to take his own tracings; or is the architect to supply them?

I am exceedingly sorry to trespass upon the indulgence of the authorities at the Institute, but I should feel exceedingly obliged if you would put the point before them. I should also venture to ask, in explanation of question 8, whether it is consistent with the position of an architect (Fellow or Associate of the Institute) to hold shares in any company formed for the purpose of building or for supplying building materials.

In conclusion, may I presume that I am at liberty to publish our correspondence?—I remain, yours faithfully,

(Signed) W. BURGES.

NOTE (December 9, 1878).—I find the declaration for Fellows runs thus: "That I will not have any interest or participation in any trade, contract, or materials supplied at any works, the execution of which I may be engaged to superintend." That is, the architect may have a brickfield or stone quarry as long as he does not use these identical materials on buildings he is engaged to superintend. But may he be a partner in a furniture warehouse, or ecclesiastical metal work establishment, if he takes care not to supply his own clients?

Royal Institute of British Architects,
9, Conduit-street, Hanover-square, W.,
December 4, 1878.

DEAR SIR,—Your letter of the 27th ult., referring to theque stions of Professional etiquette you submitted to the Council in a paper dated 20th May last, and which they answered seriatim, was laid before them last Monday. In reply I am instructed to inform you that they have nothing to add to their communication of the 12th October last, which in their opinion sufficiently dealt with the said questions.

With reference to your request for permission to publish the answers the council have given to the questions you put to them, they are of opinion that communications of such a nature between individual members and themselves should be deemed confidential.—I am, dear sir, your faithful servant,

(Signed) WILLIAM H. WHITE, Secretary.
William Burges, Esq.,
15, Buckingham-street, Strand, W.C.

THE ST. ALBAN'S ROOF CONTROVERSY.

SIR,—The brevity of your report of my remarks at the meeting of the Society of Antiquaries on the subject of St. Alban's Abbey, induces me to ask you to give another and I think more correct version of them than has been published:—"Mr. J. P. Seddon said he agreed with Mr. Micklethwaite to a very great extent. He denied altogether the assertion that St. Alban's Abbey was the better for not having the high roof which was originally intended for its long nave, and he could not see anything in the objection that the high-pitched roof would deduct from the appearance of the tower, which, though picturesque in itself, surmounted a mangled building."

Your readers would then be in a position to judge whether or not Mr. Street's characteristic reply to Mr. Micklethwaite and myself, quoted by you, was, as I think, wholly uncalled for.—I am, &c., JOHN P. SEDDON.

1, Queen Anne's-gate, Dec, 9, 1878.

SIR,—Mr. G. E. Street, R.A., stated to the Society of Antiquaries last week, as a result of his examination of the roofs of St. Alban's Cathedral, that "the whole eastern portion of the abbey was designed for flat roofs." I think, if Mr. Street looks at the roof again, he will find this is somewhat inaccurate, if by it he means that the original roof over choir, before the groined ceiling was constructed, was of similar pitch to present one. I have not visited St. Alban's since the autumn of 1877, when the roofing controversy had not commenced, but I then noticed distinct traces upon the eastern face of the tower, just below the first stage of lights, of weatherings of a roof which must have been from 65 to 68 deg. in pitch, and resting on walls some 8ft. or 10ft. lower than the present brick parapets. A photo-

graph now before me shows this weathering, as also does the view of the abbey from S.E. in Mr. Neale's recently-published monograph. As this drawing was reproduced in the BUILDING NEWS for May 24th last, readers can find confirmation of this correction by turning to the last vol. of your journal. On Sept. 22nd, 1871, the BUILDING NEWS published a sketch of the abbey from nearly the same direction, made by Mr. W. L. Lockwood, in which I must admit the weathering referred to does not show; but, indeed, no details of the masonry of the central tower are depicted in that illustration.—I am, &c.,

Dec. 12, 1878. EDWARD W. PIPER.

Intercommunication.

QUESTIONS.

[5608.]—**Concrete Kerbing.**—Can any reader inform me the proportions of the concrete used by the Tottenham Local Board for kerbing? Is it durable, and what is the price per yard?—H. T.

[5609.]—**Winfried of Kirton.**—Who was this Winfried—will some kind reader say? And is not "Kirton" a local pronunciation for Crediton? An answer will oblige—NIMBUS.

[5610.]—**Chimney Shaft.**—Will some reader kindly give me an idea as to the value of labour only in building circular chimney shaft, total height, 72ft., with base 8ft square and 23ft. high. The circular part, above base, formed with purpose-made bricks, and built hollow as high as neck moulding, the outer rim of 1 brick thick, the inner ½ brick, the two connected with ½ brick, with internal diameter of flue 2ft. 3in.? About what price per rod or per thousand bricks laid would be fair, including scaffolding for same, and raising bricks, &c.?—IRON CAP.

[5611.]—**Re-making Public Road**—In a case where the sanitary authority are re-making a street under section 150 Public Health Acts, 1875, can the owners of property adjoining or abutting on said street claim the refuse material, such as paving bricks, &c., which they take up, or can they claim an allowance from the cost of street for old material, &c.?—PROTECTION.

[5612.]—**Church Restoration.**—It is proposed to put a new roof on a village church, the round tower of which has an octagonal arcade. The church is 14th century, and the present roof runs into the arcade. Should the church be restored by keeping the roof as at present, or the tower, by altering the pitch of roof to bring in under the string of arcade? I should be glad of some opinions, as I am anxious to please even the new Restoration Society.—HARROW.

[5613.]—**Clay Foundations.**—I am about to build a two-story cottage in brick, on a site where the subsoil is clay to a very great depth, and I propose to use concrete under the brickwork footings. Will some one who has built on similar ground kindly tell me what thickness of concrete will be necessary—how deep it must be kept below the surface to be free from the influence of the atmosphere, and the proportions of lime to gravel?—BRITON.

[5614.]—**Laying out Houses.**—Is it usual or necessary for an architect who has to design a house for a site of about 4 acres to take a spirit-level and staves with him to ascertain the formation of the ground when there is not much inequality of surface? What is the method usually adopted?—PECKSNIFF.

REPLIES.

[5593.]—**Perspective.**—Very often, indeed generally, the foreground is made up afterwards. As a rule perspective draughtsmen do not make the picture-plane the seat of visible foreground or control them in any manner as to distance in front of building, and it is obvious many of the perspective views of architects illustrated suffer in accuracy in consequence.—G. H. G.

[5596.]—**Polishing Oak Floor.**—The best polish is the old-fashioned "oil polish;" but it is a very laborious and costly process—one that requires a free expenditure of "elbow-grease." The oil should be raw linseed: and after the first application mineral matter, in the form of sifted brick-dust, made from buff or yellow bricks, may be used for filling up until a level surface is obtained, after which a face may be obtained by light and periodical applications of the raw oil.—W. S., Hull.

[5598.]—**Party Wall.**—"Mutual Adviser" should apply to a local authority on the matter. It is very true according to the old rule, a building owner cannot make it obligatory on his neighbour to build a party wall with him, but in all towns with sanitary authorities such rights and liabilities of owners of party structures are regulated by bye-laws.—G. H. G.

[5598.]—**Party Wall.**—"Mutual Adviser" should have referred to the place where one naturally looks for guidance in such matters—Part 3 of the Metropolitan Buildings Act. By section 83, clause 3, the building owner—*i.e.*, the person he styles "A"—has "a right to pull down any timber or other partition that divides any buildings and is not conformable with the regulations of this Act, and to build instead a party wall conformable thereto." By section 88, clause 3, the expense of the new party structure is "to be borne by the building owner and adjoining owner in due proportion." As to the processes by which those things are to be brought about, the Act is the best guide. With the indifference usual with querists, "Mutual Adviser" omits to say whether the buildings are in the area to which this Act applies. I have, however, assumed that they are.—THOS. BLASHILL.

[5597.]—**Thickness of Zinc.**—The thicknesses given were the thicknesses of B.W.G., and should have been stated as that, the corresponding No. in zinc gauge being only approximate. The thickness of No. 16 zinc is nearly ·045in., which he can check, as a cubic foot of cast zinc weighs 439lb., and a square foot of No. 16 zinc weighs 26oz. The Vielle Montagne Zinc Co. have special Nos. of their own, as follows:—

No.		Wt. of sq. ft. in ozs.
14	...	18·75
15	...	21·75
16	...	24·75
17	...	27·69
18	...	30·79

It would have been better if the weight per square foot had been put in the specifications, instead of the No.—A. L., Glasgow.

[5599.]—**Sand in Plaster.**—If "Architect" is satisfied that it is good river sand, and wishes it to be used for economical reasons, he should insist on its being well washed with fresh water before being used in the work, for, although sand impregnated with salt water does not always "sweat" and throw off the papering, yet it has that tendency.—A. L., Glasgow.

[5599.]—**Sand in Plaster.**—River sand should not be used in external plastering. Having had considerable experience in building at the seaside, I should certainly advise "Architect" to use pit and not river or sea sand, as, if the latter is used, the walls invariably show damp in wet weather—in fact, they act like a barometer, and show every hygrometric change, while papering becomes impossible. Good coarse, clean, and sharp bank sand and road grit are the best. No one disputes the sharpness and superiority of river sand, but its saline nature renders it dangerous for all inside work.—G. H. G.

[5599.]—**Sand in Plaster.**—Our experience on this matter is, that it is not safe to use the sand, which, although river sand, has been contaminated with the sea water, and would most assuredly cause the walls to sweat. We know of a gentleman's house built at the sea-side where the plaster was made with sand taken from some bent hills which had not been covered with the sea for years, and, although the house has been built several years, the walls sweat now. This sand was washed once; but we are of opinion that were the sand washed two or three times, and in fresh water each time, it would undoubtedly greatly improve it, but not wholly extract the salt.—WRIGHT AND WRIGHT, Architects, Ipswich.

[5604.]—**Cesspools.**—Your cesspool should be about 4ft. × 3ft. × 3ft., built of 9in. brickwork, and the inside rendered with Portland cement ¾in. thick. The outside should be lined with 9in. puddle, and the whole made perfectly water-tight. The bottom will be best formed of 3in. flags, laid on 3in. of concrete, and the joints grouted in cement. The whole to be covered over with a strong flag.—W. T.

[5607.]—**Foundations of Crane.**—You do not say what weight the crane is to lift, nor whether steam or hand.—LANCASHIRE FITTER.

[5607.]—**Foundations of Crane.**—"S. S.'s" doubts about foundations are well grounded; a very little weight on end of jib to crane fixed as per his sketch would soon bring it to grief. The concrete bed should be 3ft. or 4ft. thick, and 12ft. square, under stone and walls also, say, 3ft. thick, with a massive cast-iron frame on top, well bolted down through masonry with six large wrought iron bolts, with large cast-iron plates on ends under masonry. I will try and go into this matter and give sketch if "S. S." will act upon it.—T. E.

A new block of labourers' dwellings was opened by the London Labourers' Dwellings Company, Limited, on Saturday. The new buildings are situate in Murray-street, Vauxhall, are three stories only in height, and contain 52 separate 3 and 4-room tenements arranged on the flat principle, which will be let at from 4s. 6d. to 8s. per week. Mr. Lawrence was the contractor. The cost of erection has been £6,750, and purchase of ground and other expenses an additional £1,000.

"Bull's Eye," of the *Echo*, "wonders whether Mr. Ruskin has sent to Mr. Whistler that immortal farthing which was awarded to him as a solatium for his wounded susceptibilities, and as a remuneration for his damaged commercial prospects? I can imagine a smile of grim humour passing over the great critic's face as he carefully folded up a spic-and-span new farthing, but I can scarcely imagine the facial expression of Mr. Whistler as he unfolded the tiny parcel."

LEGAL INTELLIGENCE.

BANKRUPTS' PROPERTY.—Jameson and Co. v. the Brick and Stone Company (Limited).—This case, tried on Friday last in the Court of Appeal at Westminster, before Justices Bramwell, Brett, and Cotton, gave rise to a question of law of some importance as to the power of an undischarged bankrupt to hold and deal with property on his own account. The plaintiff, who was an architect and surveyor, became bankrupt in 1873, and the bankruptcy proceedings were not brought to a close till the 22nd of January, 1878. In the meantime the plaintiff carried on business as an architect and surveyor, and during the year 1877 did some work in preparing plans and making valuations for the defendants. On the 16th of January, 1878, the plaintiff commenced this action to recover the value of the work done from the defendants. One of the defences relied upon by the defendants was, that in consequence of the bankruptcy of the plaintiff all property acquired by and debts becoming due to him during the continuance of the bankruptcy proceedings were vested in the trustee, and therefore the trustee was the only person who could recover the value of the work. It was proved at the trial that the plaintiff employed six clerks to assist him in his business, but a considerable part of the work in question was done by the plaintiff in person. The trustee had not claimed the sum due from the defendants. Lord Justice Baggallay, who tried the case, on the facts stated above gave judgment for the plaintiff. The defendants appealed. Mr. Digby Seymour, Q.C., and Mr. Gainsford Bruce, for the appellants, contended that an undischarged bankrupt could not hold property or sue for a debt on his own account, except in the case of property or money acquired by his own personal skill or labour alone. They admitted that there were decisions on the old Bankruptcy Acts against their contention, but they argued that the Bankruptcy Act of 1869 had altered the law so that those decisions were no longer applicable. Mr. Cave, Q.C. (with him Mr. Edge), for the plaintiff, contended that there was no distinction in construction between the present Bankruptcy Act and the earlier Acts, and therefore the decisions on the earlier Acts were still in force; and those decisions showed that the law was that, although as against his trustee an undischarged bankrupt could not assert his title to a sum of money earned otherwise than by his own personal labour or skill, as against other persons he had a good title until the debt was claimed by the trustee. Their lordships dismissed the appeal, being of opinion that the effect of the decisions was unaltered by the present Bankruptcy Act.

AN ARBITRATOR'S FEES.—At Preston County Court on Tuesday week, Edwin Johnson Reynolds, architect and surveyor, Preston, sued James Baldwin, joiner, for £8 13s. 1d. arbitration fees. For the plaintiff it was stated that the defendant executed some work at buildings in Bow-lane, Preston. When he had finished a dispute occurred between him and the owner of the property, Mr. Joseph Foster, and it was agreed to leave it to plaintiff for decision. The plaintiff made a valuation and sent in a bill for £8 13s. 1d., being at the rate of 2½ per cent. to each of the parties. Mr. Foster had paid his proportion of the cost, but defendant had refused. At this stage the judge asked to see a contract which had been mentioned, and the case was adjourned for its production.

ANOTHER REREDOS CASE.—On Tuesday, Lord Penzance, the Dean of Arches, heard a special application for permission to erect a reredos.—Dr. Phillimore applied in the case of "the Rev. David Williams *v.* the Churchwardens of Llanelly" to his lordship for a faculty or licence to place a reredos in the chapel-of-ease of All Saints in Llanelly, of which Mr. Williams was vicar. The reredos was to be a Scripture representation of the crucifixion of Our Saviour in Caen stone, for which funds had been provided. Dr. Phillimore said Dr. Stephens, Q.C., the Chancellor of St. David's, recently in the case of the Denbigh reredos gave an adverse decision, and thought it better to send the present case by letters of request to the Arches Court, and the application was that the letters of request might be accepted, and a citation be issued preparatory to the grant of a faculty to erect a reredos.—No opposition being offered, Lord Penzance accepted the letters of request from Dr. Stevens, Q.C., for a faculty to erect the reredos. A citation will now be issued, and any opposition can be made.—Order accordingly.

MORTAR.—A summons was heard before Mr. Paget at the Hammersmith Police-court, on the 26th ult., which had been taken out by Mr. H. Knightley, District Surveyor for Hammersmith, against Mr. Isaac Mears, of 8, Barfield-street, Hammersmith, to enforce compliance with the provisions of the Metropolitan Building Act in regard to the mortar being used in the erection of houses in Bassein Park-road under Mr. Mears' superintendence. The district surveyor stated that defendant had failed to comply with sec. 12, and with rule 2 of the 1st schedule of the Act, which requires that brickwork shall be solidly put together with

mortar or cement. Instead of using mortar compounded of lime one part, and sand three parts, a very inferior substitute had been used, composed mainly of vegetable soil slightly charred during the process of burning bricks. He had frequently remonstrated with him, and complained that the good sand, with which the neighbourhood abounds, had been dug out and sent away instead of being used in the buildings. Decided cases on the subject were referred to.—Mr. William Holditch Stevens, assistant district surveyor, corroborated Mr. Knightley.—Defendant asked witness whether pargeting mortar had not been mistaken for other mortars, but witness was able to speak to the sample having been taken from the brickwork, it bearing the impress of the brick upon it.—Witnesses were called by defendant who thought worse mortar might be used, but admitted to a great difference existing between it and a sample of good mortar produced by Mr. Knightley.—Mr. Paget said it was clear that defendant's mortar contained unsuitable ingredients. He should make his order as prayed, for the demolition of the portions complained of, allowing the district surveyor his costs.

St. Sepulchre's Church.—In the Consistory Court of the diocese of London, on the 2nd, before Dr. Tristram, chancellor, the application for a new faculty for this church came on again. A faculty had been granted by the learned chancellor to make some alterations in the interior of the church. The works in St. Sepulchre's Church were being carried on, and the churchwardens of the Middlesex portion of the parish, Holborn-viaduct, complained that additional alterations had been commenced that were not authorised, and the court was asked to interfere in the matter. On the part of the churchwarders of the City portion, who had obtained the faculty, and had the management of the funds, it was stated that other improvements were necessary, and they intended to apply for another faculty to carry out the operations in the church. Mr. Sutton now appeared as counsel for the churchwardens of the Middlesex portion; and Mr Pontfex, solicitor, for the City portion of the parish. Mr. Sutton said he appeared for Mr. Larkin, gentleman, and Mr. Colber, licensed victualler, St John-street, Smithfield, the churchwardens of the Middlesex side. There had been considerable deviation from the plans exhibited to the court, and great expense had been incurred, and if the alterations made and in progress were allowed, the expenses would be largely augmented. Mr. Pontfex asked that the evidence to be given might be confined to the alleged deviation from the faculty granted by the court. He intended to ask for another faculty to complete the works which had been commenced. Mr. Griffiths and Mr. Billings, architects, were examined with respect to the work and the proposed alteration. Dr. Tristram made an order that a citation should be issued for a new faculty to carry out the alterations which were proposed, and the Middlesex churchwardens could oppose the application. It was arranged that the portion of the works objected to should be discontinued for the present, and until the application was made, and the case was adjourned *sine die*.

WATER SUPPLY AND SANITARY MATTERS.

Wigan.—A Local Government Board inquiry was held at Wigan the other day, before Mr. J. T. Harrison, C.E., with reference to an application from the Corporation for sanction to borrow £62,665 for works of sewerage and sewage disposal. The sewage of the town is at present turned into the river Douglas, but owing to the operation of the Rivers Pollution Act the Corporation have been compelled to seek some other mode of disposal, and consulted Mr. Brundell, C.E., on the subject. He recommended that a sewage farm should be obtained at Newburgh from Lord Derby, this being a little over seven miles from the present outfall into the Douglas, and this has been adopted by the town. Mr. Brundell on Wednesday explained his scheme. The sewage would all be collected at one point near the present outfall, and conveyed in cast-iron pipes, having a capacity of four times the present sewage flow, by gravitation to the Newburgh farm. Part of the land would be prepared for broad irrigation, and a portion for downward filtration. The work could be completed by January, 1880.

STAINED GLASS.

Sheffield.—A stained glass window has just been erected in St. Barnabas' church, at Highfield. It is a two-light window, the subject being "The Good Samaritan. The artist is Mr. W. F. Dixon, University Stained Glass Works, Wharncliffe Chambers, Bank-street, Sheffield. Two windows also have been recently executed by the same artist in Ecclesall Church, representing "The Marys at the Tomb" and "The Ascension."

A new Wesleyan chapel is about to be built at Perranwell, Cornwall, from the designs of Mr. James Hicks, of Redruth.

Our Office Table.

A congress of Roman Catholics in the North of France has given its attention to the decline of religious art—a decline of which evidence was said to have been given in the ecclesiastical section of the Paris Exhibition. The decline is thus described:—"Religious imagery has ceased to be a craft: it has become a trade. Images have multiplied, but they have lost in truth what they have gained in number and in apparent external perfection. Few artists are found drawing their virgins or saints after having prayed and contemplated in supernatural vision what they wish to reproduce. Their pencil too often recollects the forms it traced the day before, and is too much occupied with the countenances it is to create the next day. It is clever and ingenious, but not Christian. What Pagan creations, therefore, under names of saints! What faces animated by worldly vanity or passion! The truth is that when an art becomes a trade it is in danger of ceasing to exhibit originality. It is because images have multiplied—as the congress admitted they have—that so much inartistic rubbish is being turned out of the Continental *ateliers*. Much of the so-called ecclesiastical art work at these times, both in England and on the Continent, might as well be done by machinery as by hand for any marks of original inspiration, of thought, or of feeling that it betrays."

A correspondent of the *Times* drew attention last week to the neglected state of the tomb of Queen Katherine of Arragon in Peterborough Cathedral. Another correspondent in a subsequent issue remarked on the condition of the cathedral itself, declaring that, "while all the cathedrals of the country have undergone restoration or embellishment, this seems to have been forgotten, though it is evident from the scaffolding still remaining in different parts of the building that attempts have been made to repair it." Archdeacon Thicknesse, in reply, states that the repair and restoration of the fabric of Peterborough Cathedral have been continuous and uninterrupted on the part of the dean and chapter for many years past, and remarks that few persons not intimately acquainted with it can have any idea of the vastness or cost of the work of necessary sustentation only in the case of such a building, upon such a foundation as this minster. During the past 10 years the shoring up of the great north wall alone, accomplished under the skill and care of the late Sir Gilbert Scott, has cost the dean and chapter a very large sum indeed, without any assistance from the public. With regard to the monument of Queen Katherine, the Rev. Mackenzie E. C. Walcott in the *Times* of Dec. 9 quotes some extracts from "Gunton" and Broune Willis, which he considers afford "ample and picturesque precedent for the additional protection of the tomb by the dean and chapter, in the form, at the least, of a metal framework or herse, such as remain at Warwick and Westminster." If they proceed further in good works, Mr. Walcott trusts that they will first restore the choir to its original position beneath the lantern.

On Tuesday evening the silver medals and premiums for what is called the intermediate year (the gold medals and scholarships being given every second year) were distributed at the Royal Academy. Unusual interest attached to the proceedings, this being the first occasion on which the new P.R.A. presided. Sir Frederick Leighton was received with the warmest demonstration of respect and enthusiasm from the students who filled the lecture-room. The president delivered no set address; but after a touching allusion to the merits and memory of Sir Francis Grant, in whom they had all lost a friend, he proceeded to distribute the prizes. At the close of the proceedings Sir F. Leighton paid a marked compliment to the keeper, and three cheers were given for Mr. Pickersgill. The following is the list of subjects and the names of the successful competitors:—Composition and design of a Figure picture—"David Returning in Triumph from the Slaughter of Goliath"—Armitage Prizes—1st, £30, Herbert A. Bone; 2nd, £10, Sam. M. Fisher. Cartoon of a draped figure, "St. Paul before Agrippa"—silver medal, Arthur Hacker; painting of a figure from the life, silver medal, George H. Manton; painting of a head from the life, silver medal, Charles K. Warren; copy of an oil painting, silver medal, Emma L. Black; drawings of a figure from the life, silver medals—1st, Francis Barraud; 2nd, Sam. M. Fisher; drawings of a head from the life, silver medal, William Wontner; silver medal, extra, William Walker; *Proxime accessit*, Jennie Moore; drawing of a statue or group, silver medal (first), Mary Drew; ditto (second), Ellen Neilson; best drawing done in the Life School during the year, £10, E. B. Leighton; best drawing done in the Antique School during the year, £10, Mary Drew; restoration of a mutilated antique statue, "The Ilissus," silver medal, Arthur G. Atkinson; model of a figure from the life, silver medal (first), Arthur G. Atkinson; ditto, silver medal (second), not awarded; design in architecture, "A Town Hall," travelling studentship for the year, £130, William Scott; architectural drawing, "Gateway of Somerset House," silver medal (first), Robert W. Gibson; ditto, silver medal (second), Frank B. Baggally; perspective drawing and sciography, "Porch of the Temple Church," silver medal, William H. Wood. We have reviewed the architectural designs at length on another page.

An exhibition of tapestries was opened last week at the Town-hall, Windsor. The chief specimens were recently on view at the Paris Exhibition. The collection includes eight large panels representing scenes from the "Merry Wives of Windsor," the designs being by Mr. T. W. Hay. They formed the dining-room decoration at the Prince of Wales's pavilion, and received a gold medal. They are now the property of Sir A. Sassoon, K.C.S.I., by whom they have been lent for the purpose of the present exhibition. There is also a series of panels of tapestry representing hunting scenes, designed by Mr. E. M. Ward, R.A., for Mr. Christopher Sykes, M.P., and a number of smaller productions. Among the other specimens is a large panel representing the siege of Londonderry. It formerly was a panel in the old Irish House of Lords, Dublin, now transformed into the Bank of Ireland. It has just been restored at Old Windsor. It is said to have been the work originally of Huguenot refugees. The exhibition also includes a series of eight panels in appliqué work on gold ground, part of the decoration of the morning-room in the Prince of Wales's pavilion, and executed by the Ladies' Work Society, of which Princess Louise is the president. There are also a number of valuable pictures by Bristow (a native of Windsor), Algardi, T. F. Dicksee, Millais, &c.

A paper on the "Rating of Railways" was read by Mr. T. Fenwick Hedley, at the Institution of Surveyors on Monday evening. The speaker considered that there are great objections to the present mode of rating railways, first, on account of the "parochial" principle being adopted, by which was meant that every few chains of railway in a parish are treated as a separate hereditament, and valued as a separate railway—a system resulting from the supposition that, when railways were projected, they would be worked like canals, the public finding their own engines and waggons and paying toll for the use of the line. Another difficulty is that the law gives no power in making all the parishes co-operate in rating the several parts lying in each parish, so as to protect the occupiers of railways from being rated in the different parishes beyond the rateable value of "the whole taken together." But the chief difficulty in fair rating is the conflicting decisions of the judges and the glorious uncertainty of the law. It was urged that the principles of railway rating ought to be definitely settled by an Act of Parliament somewhat similar in scope to that by which railways and canals were rated in Scotland—the 17th and 18th Vict., cap. 9. To overcome the trouble and difficulty of taking out the traffic receipts in each parish, in order to fix a percentage as rateable value, he suggested that it would be feasible to reduce all the railways and sidings to a mileage rate as a single line by reducing the lengths of the lines of each system open for traffic to the length as a single line, and by adding to the length of the railway, as a single

line, all the sidings, and dividing the aggregate rateable value of the railway *per se* by the total length of the single line and sidings.

Earl Cowper, in a letter in the *Times* of Saturday last, declares that the whole question of the roof of St. Alban's Cathedral is reopened by the resolution of the meeting of the Society of Antiquaries, which we reported last week. Canon Davys writes "at once to dispel" any idea that the restoration committee have abandoned their high roof. He says:—"Preparations have been made for its construction. The chief point left open was its covering, which of late has brought the coppersmiths about our ears, who have done us much evil. But though the pitch of the roof has been determined, the details of the work are yet under consideration, and I sincerely hope that means may be devised for the preservation of every particle that is capable of preservation in the present roof and ceiling. We shall too, I hope, find it needless to build parapets, which never existed until the roof was cut down, and arrange some covering which, if lead is a pecuniary impossibility, may agree in form with the oaken shingles that originally rose from the ancient corbel tables."

In a lecture delivered at the London Institution on Thursday week, by Mr. Comyns Carr, on "The Present Tendencies of English Art," the lecturer remarked that there were many persons who had no belief in English art, and no belief in its future. This conviction might be right or wrong, but it was not his idea. The growth of art in England was due to foreign sources. We had great picture-collectors and connoisseurs before we could boast of great artists. From the time of Titian to our own the claims of realism had been in the ascendant. In this there was to be found an element of hope in the future. From Flanders it was that the English school borrowed its first lesson. Passing by Lely and Kneller, it was not till the time when Reynolds and Gainsborough arose that they saw what was like a new birth of art in England, as it was the birth of new English art. Now, for the first time, England possessed a school of painting of her own. Gainsborough not only held rank with Reynolds as a portrait-painter, but he was the founder of the English school of naturalistic landscape. Before these men began their work another artist had arisen—Hogarth—and whatever the faults or limitations of his genius his work possessed the invaluable quality of sincerity. The name of Hogarth deserved to live with those of Reynolds and Gainsborough as the founder of the English school of *genre* painting. Blake was a seer rather than an artist. After referring to West, Harding, Lawrence, and Wilkie, the lecturer remarked that there were few countries which could claim a finer race of landscape-painters than England already possessed in her history, and she might also boast of her school of water-colour painting, and when they came to Turner they found in him that the two modes of expression were combined. As we approached the art of our own day they observed in the pre-Raphaelite school the absolute sincerity of all that was done under the new spirit. It had one element of hope and safety. Now, for the first time, an effort was made to revert to the source instead of to the completed forms of past achievements. Mr. B. Jones might be taken as an exemplar of this revival of the art of passion, and in the person of Mr. Millais they had a realistic portrait-painter of whom they had reason to be proud. We might say that we were what the past had made us, and our best hope for the future of English art lay in the better understanding of its struggles and its failures in times gone by.

Mr. Nevill Northy Burnard, the Cornish sculptor, died at Redruth, on the 27th ult. He was born at Altarnun, in Cornwall, in 1818, and brought up by his father as a mason. Without the aid of education, and with no other tools than those which he had himself been able to make, he executed from the frontispiece of the *Penny Magazine* for 1832 a carving of the "Laocoon" in Cornish slate. For this he was rewarded by the council of the Polytechnic Society at Falmouth with their first silver medal. With this encouragement, and with the friendly assistance of Sir Charles Lemon and other gentlemen, he executed busts of the Prince of Wales and many distinguished Cornishmen, as well as the statue of Richard Lander, the explorer of the Niger, which surmounts the Lander monument at Truro. Mr. Burnard exhibited at the Academy, among other works, busts of Gerald Massey (1855), the Corn-law Rhymer and James Montgomery (1858), Mr. Cobden (1866), and Thackeray (1867). His later productions did not, however, sustain the promise of his youth, and his last days were spent in neglect and obscurity.

The St. Pancras Iron-work Company is the only firm who show any fittings at the Smithfield Club Cattle Show, 1878, for cow-houses, and they exhibit several different designs of their improved sanitary iron fittings for cattle-stalls and piggeries. These are designed after the recommendations of scientific and practical men, and while dispensing with any complicated arrangements are thoroughly strong and safe for the beasts, and calculated to prevent waste of food and any spread of contagion. Their system of water supply and general arrangements for perfect cleanliness are particularly well thought out. Their patent piggery fittings are also strong, simple, and efficient, ensuring cleanliness and economy in food supply. Their exhibits at the Paris Exhibition obtained a silver medal, stand No. 185 in gallery.

The Sanitary Appliance Company, Limited, of Salford, have made several improvements in their self-acting cinder-sifting ash-closets, and the system is being largely adopted all over the country at cottages, schools, and public institutions. The apparatus is simple and moderate in cost. Over 3,000 have been applied in one district. The cinders saved for reburning form an important item of economy, and a valuable manure is produced. The company also supply earth-closets of very simple construction.

A movement has been started by Canon Clarke, the Vicar of Battersea, for re-erecting the colonnade of Burlington House, which for the past 11 years has been lying as neglected fragments of disjointed masonry on the river front of Battersea Park. The colonnade is of fine white Portland stone; it was designed by Richard Boyle, third Earl of Burlington, when only 23 years of age, and erected by him in 1717 as an addition to the family mansion in Piccadilly. It was described by Horace Walpole as "an imposing example of the purest architecture," and Sir William Chambers, in animadverting on the dull appearance of English noblemen's town residences, remarks: "Few in this vast city suspect that behind an old brick wall in Picadilly there is one of the finest pieces of architecture in Europe." When Burlington House was pulled down in 1867 to make room for the Royal Academy it was agreed, on the appeal in Parliament of Mr. Beresford Hope, that the stones should be numbered and conveyed to their present, resting place with a view to setting them up again. Since that time the well-proportioned pillars, their capitals and bases, the stones of the friezes and entablatures, many of them covered with crests and coats of arms, and even the great wooden doors, with knockers still attached, have remained prostrate, uncared for, and unprotected close to a park entrance and bridge approach, the playground of children, and the reproach of successive First Commissioners of Works. The not unnatural consequence of this neglect is that some of the stones have been broken; but the majority are said to be in a good state of preservation. The present proposal, which has been submitted to her Majesty's Office of Works, is to erect them as a semicircular group of pillars, forming an approach to Battersea Park from the steamboat pier. This does not seem to us a sufficiently dignified situation for so fine an example of 18th century Palladium architecture, and is too close a parallel to another misplaced re-erection on the opposite bank of the Thames; still, as in the case of the obelisk, it is perhaps better to set the colonnade anywhere than to allow the stones to be broken up and stolen. As economy in the re-erection of removed monuments is the fashion of the hour, the scheme may be faintly recommended as "better than nothing." By the way, what is to be done with Temple Bar? Its stones were numbered with great care, and a foolish fellow was prosecuted for pilfering a chip, but nothing has been heard of the cumbrous gate since its stones were shot on the hideous waste beside the Blackfriars end of the Victoria Embankment, except that the aldermen and city councillors have solemnly voted themselves medals cast from the lead-work.

The French Minister of Commerce has accepted with gratitude the façades which Messrs. Lascelles and Doulton have offered for the Industrial Museum, which is to be founded in Paris, and informs Sir Philip Owen that they will serve as a valuable souvenir of the cordial relations which have contributed so materially to the success of the Exhibition.

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CHIPS.

Alterations are about to be carried out for the Northampton Guardians in the female receiving wards of the workhouse. Mr. Hall's plans have been approved for the work.

The *City Press* states that the employés of Messrs. J. Mowlem and Co. are about to present Mrs. Burt with a likeness of Mr. Sheriff Burt in his official robes, in testimony of the kind feeling they entertain for him. Upwards of 1,000 of the staff and workmen have already subscribed, and the painting is to be executed by Mr. Edgar Williams.

At last week's meeting of the Edinburgh and Leith Engineers' Society a paper was read by Mr. John C. Mackay, C.E., on the Ebbw Vale Waterworks. It was stated that the depth of the reservoir at its deepest part is 48ft., and that it has a capacity of 61,000,000 gallons, giving 18 gallons per day to 20,000 people for 104 days, besides allowing compensation to the river Ebbw. The total cost of the reservoir, two filter beds, tank, &c., was £25,000, and the necessary fittings and pipes for distributing the water came to about £6,000 more, thus bringing the entire cost of the whole work to £31,000, representing £516 per 1,000,000 gallons, or 10s. 4d. per 1,000 gallons storage.

The new Church of All Saints, Lambeth, was opened last week. The style is described as Decorated. The architect is Mr. A. Bedborough. The chancel is apsidal, with five lights, three of which are filled with stained glass. The chancel arch is supported by semi-shafts of marble. The baptistery is placed at the north entrance.

The Bermondsey vestry decided last week by a small majority of votes to build a new vestry hall, which shall at the same time be sufficiently capacious to be used for public purposes.

A parish meeting was held at Kirkland, near Carlisle, on Thursday week, to consider the condition of the parish church, which has been rendered unfit for service by the fall of the north wall. It was decided to instruct Mr. Thomas Baxter to examine the walls and roof, and report their condition and the extent of the necessary repairs to a committee.

Maynard-road Congregational Church, Rotherhithe, has been re-opened after the execution of extensive repairs and alterations, including the erection of a gallery, seating 140 persons, and of a rostrum. Mr. Pritchard, of Tooley-street, was the builder.

Mr. J. S. Hodgson, of Hexham, has been appointed consulting engineer to the Local Board of Health for Wigton, Cumberland.

The Severn Tunnel is making satisfactory progress. The two shafts on the Gloucestershire side of the river at New Passage have been completed. Each shaft is lined with brick and made waterproof. The brickwork was formed on an iron curb, which, as the brickwork proceeded, gradually descended, so that the bricking was done throughout from the summit of the shafts. A heading has been commenced from one of the shafts to meet that on the Monmouthshire side of the Severn, which is over 7,600ft. in length.

The memorial stone of a new vicarage was laid by the Bishop of St. Alban's at Dovercourt next-Harwich, on Tuesday week. The vicarage is Domestic Gothic in style, and is being built from the designs of Mr. G. Gard Pye, of Colchester, at a cost of about £2,000. Mr. J. W. C. Butcher, of Harwich, is the contractor.

New school buildings are about to be built for the School Board for Downham Market, Norfolk, at Barroway Drove. Mr. Walter Robinson has been appointed architect.

At a large gathering of the carpenters and joiners of Cardiff, at the Masons' Arms, in that town, on Saturday evening, a valuable clock and an illuminated testimonial were presented to Mr. Henry Wale, in recognition of his services as the representative of the Amalgamated and General Union Societies of Carpenters and Joiners during the recent disputes in the building trade. The presentation was made by Alderman Jones. In the course of the evening the toast was proposed of "Success to the Master Builders of Cardiff," to which Mr David Jones, chairman of the Master Builders' Association, responded.

The tender of Mr. William Broad, of Porthleven, has been accepted for building the proposed Wesleyan chapel at Trevarno, Helston. The style of the new building is Decorated Gothic. The seats will be arranged amphitheatrewise. The architect is Mr. Hicks, of Redruth.

To prevent the further pollution of the Roach, and to comply with the provisions of the Rivers Pollution Act, the Rochdale Town Council have instructed Mr. R. Vawser, civil engineer, Manchester, to complete the necessary plans for intercepting and purifying the sewage of the borough.

At the twenty-fourth annual general meeting of the Society of Engineers, on Monday, it was announced that the following premiums had been awarded by the council for papers read during the year—viz., to Mr. Henry S. Copland, for his paper "On Modern Roadway Construction," and to Mr. George G. André, for his paper "On the Application of Electricity to the Ignition of Blasting Charges."

St. Jude's Church, Chelsea, has just been provided with new pitch pine open seats and a new pulpit. The fronts of the seats and the pulpit are carved, the latter, which is hexagonal in plan, having inlaid panels of oak, walnut, and ebony parquetrie. The work has been carried out by Mr. W. Balcombe, from the designs of Mr. E. H. Lingen-Barker.

A new Baptist chapel was opened at Ottery St. Mary, Devon, on Thursday week. It adjoins a former chapel, which will henceforth be utilised as a schoolroom. It is built of brick, with Beer stone dressings, and measures 50ft. by 30ft. The seats are of pitch pine varnished, and accommodate, including provision for choir and children in gallery, 350 persons. The architects are Messrs. Packham and Croote, of Exeter, and the builder is Mr. E. Carnell, of Ottery. The cost is said to have been only £500.

An eagle lectern, of highly polished and wrought brass, has been presented by Miss Lanyon, of Truro, as part of the furniture of the future cathedral church. It is a replica of the one designed by Sir Gilbert Scott for Chester Cathedral, and was one of the exhibits at the Philadelphia Exhibition. It was constructed by Messrs. Cox and Co., of Southampton-street, Strand, and has upon the globe supporting a dragon and eagle the inscription:—"In honorem Dei; Eccl. Cath. B. V. M., Truro. D. Henrietta Lanyon, mdccclxxviii."

Rear-Admiral Willis, on Wednesday, laid the foundation stone of the new dock at Devonport Dockyard. It is to be 386ft. in length, thus being the largest dry dock in the world. The contractor, Mr. Petbick, was warmly congratulated by the Admiral Superintendent on the indomitable skill with which he had surmounted difficulties arising from the serious accidents from storms and landslips during the preliminary excavations.

A covered way is about to be formed between the central meat and poultry markets at Smithfield from the designs of Mr. Horace Jones, the City architect. The cost is estimated at £2,800.

The Paignton School Board considered on Thursday, the 5th, a report received from Mr. G. S. Bridgman, of Torquay, the architect of the new schools in Curledge-street, on those buildings the walls of which have been found to be settling. Mr. Bridgman advised that stone buttresses be built against the south-east corner, and that the cracks be stopped both externally and internally in the wood and stone work. The chairman of the Board (Mr. Eastley) said it was most unsatisfactory to have to disfigure the new buildings with buttresses, and he could not help feeling that Mr. Bridgman, as architect of the new schools, had shown some neglect. The following resolution was carried unanimously:—"That Mr Bridgman be communicated with to the effect that the board, having read his report, expressed their disappointment at the present unsatisfactory condition of the buildings, having regard to their very recent erection, and think, under the circumstances, that Mr. Bridgman will not object to suggest and superintend such alterations as may be necessary to their stability free of expense to the board; also, that Mr. Bridgman be asked to prepare an estimate for doing the work."

A new church is about to be built in Upper Orwell-street, Ipswich, for the district of South St. Margaret. The plans, prepared by Mr. E. F. Bisshopp and approved by the committee, show a nave and aisle, 81ft. by 28ft. 6in., and 38ft. high from floor to roof apex. A chancel arch will be inserted to allow of the future extension eastward. The style is 13th century, simply treated; the materials red bricks with yellow brick and stone dressings externally, and within white bricks with bands of yellow brick. The roof is designed in wrought fir, with tie beams, principals, purlins, struts, and vertical boarding, and in the centre is a double bell turret. The arcades rest on stone columns. Open benches will seat 350 persons, at a total estimated cost of £3,500.

On Monday the memorial stone was laid, at Exeter, of a block of artisans' dwellings, to be erected by a local benefit building and freehold land society. The block is an attempt to erect substantial and convenient houses, fitted for the working classes, which could be let at a rent within the means of those for whom they were intended, and yet at the same time give a return of 5 per cent. on the capital invested. The property abuts on Rack-street, on the west quarter, and in front on the Broad Stones. It is intended to erect eleven dwellings, each containing five rooms, and though the buildings will necessarily be plain and unornamental, they will provide what is required for health and comfort. The dwellings will be formed of three separate blocks—one of five and another of four—running parallel with each other, and two at the higher end of the site. The entrance will be from Rack-street. The architects are Messrs. Packham and Croote, and the cost of each house is roughly estimated at about £170. Messrs. Braily and Son are the builders.

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MEETINGS FOR THE ENSUING WEEK.

MONDAY.—Royal Institute of British Architects. Paper by Captain Burton on "Remains of Buildings in Midian," 8 p.m.

" Society of Arts. Cantor Lecture on "Mathematical Instruments," by W. Matticu Williams; No. 4, "The Theodolite, Instruments for Levelling, and Direct Measurement of Altitudes," 8 p.m.

WEDNESDAY.—Society of Arts. "Science Teaching in Elementary Schools," by Dr. J. H. Gladstone, F.R.S., 8 p.m.

FRIDAY.—Architectural Association. Discussion: "Architect" or "Architect and Surveyor," to be opened by A. Payne; 7.30 p.m.

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Trade News.

WAGES MOVEMENT.

DUNDEE.—The wages of masons in Dundee have been reduced from 7½d. to 7d. per hour.

LANCASTER.—The notice to the joiners in the employ of the extensive firm of Gillow and Co., requiring the men to work 58½ hours instead of 54 hours per week expired on Monday week. The result of a conference between the employers and the employed was that the latter agreed to a reduction of two hours upon the wages they receive. By this arrangement a strike has been averted.

LINCOLN.—A meeting of the Lincoln Master Builders' Association was held last week to take into consideration the question of a reduction in the wages of workmen in the various branches, and an increase in the hours of labour. After a discussion, it was unanimously resolved that notice to this effect should at once be sent to the representatives of each branch—carpenters and joiners, masons and bricklayers; such notice to expire according to the agreement made between the operatives and employers some time since. By this arrangement the alteration, so far as regards the masons, will take place at the end of three months from the time the notice was given; the carpenters, joiners, and bricklayers, six months.

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TENDERS.

BRENTWOOD.—For the erection of infirmary, infectious and probationary wards, and other works at the district schools, Brentwood. Messrs. Lee and Smith, architects, 7, Queen Victoria-street; quantities by Messrs. Linsdell and Giffard:—

Nightingale	£19,657
Hunt	19,200
Bangs	18,980
Sawyer	18,886
Perry and Co.	18,500
Greenwood	18,480
Forrest	18,385
Goddard	18,164
Hayworth	17,748
Smith	17,747
Beale	16,862
Jones and Co. (accepted)	16,459

DAWLISH.—For fencing and gates and building of sustaining walls on the Sea Mount Pleasure Ground, for the Local Board of Dawlish:—

Baker, H.	£167 4 0
Friend, S.	145 16 0
Lamecraft, J. (accepted)	115 9 8

FULHAM.—For paving Wellesley-road for the Fulham District Board of Works. Mr. A. C. Bean, surveyor to the Board:—

Wilson, F.	£720
Coat	697
Serff	688
Nowell and Robson	679
Baxter	670
Alfred (accepted)	647

[Surveyor's estimate, £692.]

HAMPSTEAD.—For the enlargement of the schools now being erected in Fleet-road, Hampstead, from 800 to 1,200 places for the London School Board:—

Wall Bros. (accepted)	£3,000

[Cost per head of existing school (in course of erection by same contractors), £13 4s. 8d.; cost per head of enlargement, £7 10s.; cost per head of complete school, £11 6s. 5d.]

HANLEY.—For the erection of Board schools, play sheds, boundary walls, &c., in Wharf-lane, Shelton, for the Hanley School Board. Mr. W. A. Keates, architect; quantities supplied:—

Collis	£3,630
Youall and Heath	3,400
Barlow	3,395
Redfern	3,325
Corns	3,250
Gallimore	3,245
Jukes and Weston	3,215
Grosvenor	3,200
Meadow	3,050
Emery	2,995
Clarke	2,940
Windsor and Co.	2,880
Ellis	2,870
Matthews (accepted)	2,698

HEREFORD.—For putting in four new skylights in the museum room at the free library:—

Bowers, J.	£56 0 0
Welsh, H.	49 0 0
Lewis, T.	39 0 0
Bowers, W.	31 0 0
Crowe, W. and J. (accepted)	28 17 0

LONDON.—For sundry works in finishing at Tolmers-square Congregational Schools. Messrs. Tarring and Wilkinson, architects, 69, Basinghall-street, E.C.:—

Joiner's work in preparing for glazing:

Morley	£195 12 6
Anley	185 0 0
Veitch and Close	153 10 0
Bebington	114 0 0

Glazing:

Ramsey	127 12 8
Bussell, Gibbs, and Co.	122 10 0

ROTHERHITHE.—For two iron cisterns at Rotherhithe. Mr. H. Saxon Snell and Son, architects:—

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May Bros.	535 0 0
Perry and Co.	512 0 0
Berry and Sons	505 0 0
Benham and Sons	501 10 0
Turner and Co. (accepted)	487 0 0

SALISBURY.—For the erection of corn stores, stabling, and other works at Fisherton for Mr. G. J. M. Main. Mr. Fred Bath, architect; quantities supplied:—

Hopkins, James, and Son	£1,690 0 0
Harris, G. and C.	1,670 0 0
Hale and Sons	1,600 0 0
Young, E., and Sons	1,555 0 0
Cooper, Henry	1,525 0 0
Barber, John	1,510 8 0
Sawkins and Mist	1,483 0 0
Adey, W. H.	1,477 0 0
Harris, Abel	1,445 0 0
Kite, H. J.	1,377 10 0
Tryhorn, P. (accepted)	1,334 0 0

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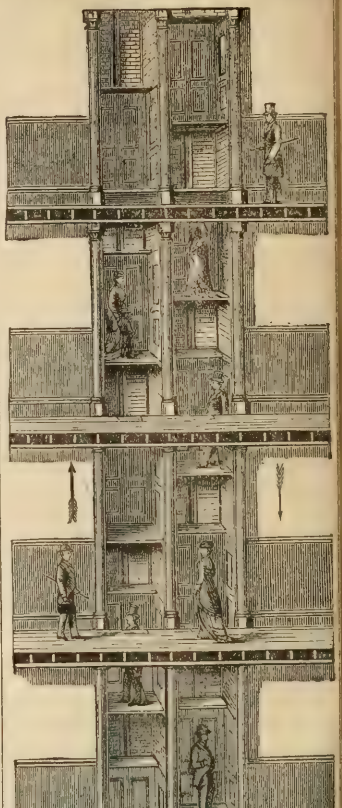

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THE BUILDING NEWS.

LONDON, FRIDAY, DECEMBER 20, 1878.

OUR METROPOLITAN BRIDGES—ARE MORE WANTED: IF SO, WHERE?

A LITTLE *brochure* under the above heading is before us, written by Mr. J. B. Redman, M.I.C.E., in which the endeavour of the author is to show that the relief of crossing traffic would be better served by a bridge above rather than below London-bridge. To prove this, Mr. Redman enters into particulars respecting the six main bridges, Vauxhall, Westminster, Waterloo, Blackfriars, Southwark, and London, now all free except Vauxhall. He alludes to the increased traffic over Waterloo since the toll was removed, and points out how the main streets on the Surrey side "radiate from such centres as the Obelisk and Elephant and Castle towards the concave side of the curved reach of the river from Westminster to the Pool, below which the Metropolitan Docks so engross the frontage as to bar the way to approaches for fresh bridges." Referring to the existing bridges, Vauxhall and Lambeth bridges are considered too narrow and steep in their approaches to receive the traffic; Charing-cross railway bridge footway is inadequate, with its timber stairway and inclined plane approaches; while the gradient of Waterloo on the Surrey side—1 in 33—and its low archway are pronounced a hindrance. Blackfriars has a "long dead pull on each side to the centre of the bridge" of 1 in 40: Southwark has steeper approaches—1 in 22 to 30; while London-bridge has an incline of 1 in 28. Such being the condition of the ten metropolitan bridges crossing the Thames, the author questions whether a bridge above London-bridge is not desirable. The returns of the traffic taken in January, 1877, for the Court of Common Council, are quoted to prove that slightly more than one-fifth of the whole vehicular traffic that crosses London-bridge passes from north-east to south-east, or *vice versâ*, and consequently represents the demand for an eastern or Tower bridge; and that only about one-eighth of the entire traffic would be benefitted by it; while, on the other hand, a much larger proportion, it is contended, pass from north-west to south-west and *vice versa*. The author therefore maintains that a St. Paul's-bridge, as proposed by Mr. Bennoch in 1853, would afford the greatest relief to the surcharged traffic of London-bridge.

The position suggested would be at the south-east angle of St. Paul's Churchyard to Guildford-street, Southwark, or the bridge would cross the river about mid-way between Blackfriars and Southwark bridge. Without the aid of a map it would be impossible to follow Mr. Redman into the details of levels and approaches to which he refers; we may, however, briefly notice some of his arguments.

The "St. Paul's-bridge," it is asserted, would afford passage to a stream of north and south traffic, 25 feet higher than the main north Blackfriars approach, or 50 feet above Ordnance datum mainly to and from the northern metropolis by Aldersgate-street, St. Martin's-le-Grand, and St. Paul's Churchyard. The new bridge would, it is said, tap the north-west traffic by Oxford-street, Holborn, and the Viaduct; the Blackfriars traffic by Farringdon-street being entirely separated from the northern stream by Aldersgate-street and by the steepness of Ludgate Hill. As regards the approaches, a northern declivity of 1 in 45 towards the bridge, and a southern one at a fall of 1 in 40 is estimated, and the total length of the bridge and approaches is calculated to amount to 3,050 feet, or nearly five-eighths of a mile. A Tower high-level bridge as contemplated, 100 feet above Ordnance datum, would, it is stated, have a total length of approaches and bridge of about 1 and 7-16ths of a mile. In both cases the elevated portions of the approaches would be constructed on viaducts, or utilised as warehouses and vaults. In the case of the suggested "St. Paul's" bridge, from Thames-street to the river, on the Surrey side the approaches on viaducts would vary from 10 to 30 feet, and might be used as vaults; while on the high-level Tower bridge the viaduct on the south side would be from 20 to 80 feet in height. It is further objected to the Tower bridge that it is of great length, and that a "large amount of the lateral riparian traffic would not seek such distant points as the Whitechapel Obelisk northwards, and the Grange-road, Bermondsey, southwards, and that consequently a large proportion of traffic from the wharves and docks would still seek the present route," and that it would involve fully double the outlay of one at "St. Paul's" site, which is estimated at about three-quarters of a million.

Mr. Redman makes out a tolerably fair case from a *primâ facie* examination of the map of London, his main argument appearing to rest upon the fact that the main thoroughfares north and south converge towards London-bridge, the Metropolitan Docks entirely engrossing the frontage and obstructing any crossing eastwards. The argument would rest if London was bounded on the eastwards by the docks, but it extends far beyond, and Mr. Redman has overlooked the fact that the radiating roadways were formed at a period when the metropolis was far more limited, and central in relation to them. The objection to a Tower bridge on the plea that the traffic across London-bridge is chiefly north-west to south-west and *vice versâ*, if based on accurate statistics, can only be true of the traffic originating between London and Southwark bridges, for it would be absurd to suppose vehicular and pedestrian traffic would make a longer detour eastwards than necessary. To contend that vehicles and passengers along the Mile-end, Whitechapel, Commercial roads, Mint-street, St. George-street, &c., would prefer London-bridge to one at the site of the Tower is too far-fetched an idea to command attention, and the same remark applies to the Surrey side of the river. Again, if Grange-road is the best point for collecting the eastern traffic from the Surrey Canal, Commercial Docks, and wharves, as contended, it follows that a bridge eastward of London-bridge and somewhere in continuation of Bermondsey-street, would afford the most direct route. The author says, since Mr. Bennoch proposed in 1853 a St. Paul's bridge, circumstances have arisen which render the site more than ever desirable—namely, the relative levels of Cannon-street, Victoria-street, and the Holborn Viaduct. But it is clear that Blackfriars-bridge is the direct and natural crossing for the north-metropolitan traffic of Farringdon-road, while Queen Victoria-street relieves and taps the traffic east of it, and is, as far as levels go, well served by the same bridge, besides leading in a direct line to its embouchure. Now Aldersgate-street and its approaches are nearly as conveniently served by Southwark and Blackfriars bridges as it would be by an additional one east of St. Paul's Churchyard, with considerable alteration in the approaches to make on the north and south sides. Doubtless the steepness of Ludgate-hill is a great impediment to traffic by Aldersgate-street, and a bridge between those of Southwark and Blackfriars would be of use; but, after all, the accommodation furnished by Southwark and Blackfriars bridges is far better than that afforded by London-bridge for the dense population dwelling eastwards—as at Whitechapel, Mile-end, Bermondsey, and Greenwich. The way to look at the question is to take the map of London, and compute the areas north and south already provided with bridges. If the total population is divided by the number in the bend of the river, it will be found that the central sections of the metropolis are much better provided than the areas east of London-bridge, and this should be an unanswerable reason for a bridge at the Tower.

As to the question of gradients, the author rests his proposal largely on the easier gradients a St. Paul's bridge would have as compared with an eastern bridge; but it must be remembered that this is not the paramount consideration. The steepness of the Surrey approaches admits of improvement; but a bridge once fixed becomes unalterable, and its position should be determined solely by the requirements of the areas of population. The figures given in the appendix show a very slight difference in favour of St. Paul's site over that of the Tower, on the Middlesex side—the former being 1 in 45½, and the latter 1 in 43, for maximum gradient, and on the Surrey side 1 in 40—and as to the greater length of approaches required by the Tower site, though an element of cost, we hardly think it is a point to be regarded in deciding upon a structure of such metropolitan convenience as a new bridge over the Thames.

THE ROMAN RESEARCHES—HADRIAN'S VILLA.

THE third series (the others have already been described, see pp. 387 and 469) of explorations connected, first with the almost prehistoric, and then with the historic, life of Rome, was undertaken to discover, beneath and about the well-known superficial ruins of Hadrian's Villa, some evidences hitherto hidden of what were the private domestic accommodations of the Roman Emperors. Trajan's house, as known to tourists, but still more as revealed to archæology by these latest excavations, is the typical building of its class, and few expected that, far beneath where its foundations were supposed to be, lay the plans and the substructure of an edifice far nobler still. Strictly speaking, however, the site is not Roman, although the vicinity is, because the gazeteers have assigned it to Tivoli, a modern place, with a corrupted name. But when the researches were pushed beyond and below the old points of view and surfaces familiar to guides, a fresh light broke upon a most important period of classic luxury and architecture. No palace ever erected ever approached, in real vastness and sumptuousness, the Villa of Hadrian, and in the light or the shadow of it the world reads a large chapter of Roman history. The ground covered was many acres square, and within its circuit are now discovered nothing except enormous subterranean labyrinths—which the modern archæologists have, with some purpose, resolved to explore—prodigious scattered blocks, and here and there outlines of buried walls. These, it may be remarked, fit in well with the excavated outlines on the Esquiline and Palatine hills, though belonging, in many instances, obviously to a later date. The point of interest, indeed, was to determine whether the Emperor Hadrian built from an idea of his own, or whether he adopted a tradition, inherited from his predecessors. Unfortunately the mercenary Italian archæologists have hitherto made it a mine of spurious discoveries, but fortunately, on the other hand

many world-known monuments have been recovered from within its precincts, as many others are waiting to be disinterred—the red antique Faun, the celebrated Centaurs in grey marble, the Harpocrates of the Capitol, the Muses and the Flora of the Vatican, the Antinous bas-relief now in the Villa Albani, and the famous mosaic of the Doves. With all this, until recently, the Villa of Hadrian has remained an enigma, with its mingled blocks of stone and masses of brick, aggravated by the audacious forgeries of Italian archæologists, who published by thousands copies of inscriptions discovered in the Hadrian Palace, but which never existed there. It is now, for the first time, that we have a faithful description of this marvellous edifice, as its broken ruins remain above ground, and as its more neglected—yet perhaps on that account more authentic—vestiges remain below.

The Emperor Hadrian, be it always remembered, in connection w th this work of a unique genius, so often described, and until just lately so little known, was by both birth and culture half an Italian and half a Greek, and when he contemplated rearing a palace on the Tiber, stood aloof equally from both. In his choice of a site he was, from a picturesque point of view, unhappy; from another, far more important, his sagacity has never been questioned. He selected the healthiest spot upon which builder could build, on the breezy spurs of the Apennines, within reach of a western wind, protected by hills against the sirocco. The ground was of an uneven surface, and the architect caused it to be levelled, whether by hewing down protuberances in one direction or laying down masses of masonry in another, until a partly natural, partly artificial terrace of three miles in extent was obtained. Hence the vast subterranean spaces left for modern antiquarianism to explore. Hadrian, however, was by no means enslaved by the idea of a universal dead level. He rather delighted, as it now seems, in steep and sudden, if not considerable descents. He would have one range of chambers placed so much below or so much above another, for he was determined that there should be found in Hadrian's Villa circumstances of construction and arrangement to be discovered nowhere else. It is only since the late investigations have been carried out that we have been enabled to comprehend his meaning. Among the subterranean devices were two arched passages of immense length, through which streams of living water were, it would seem, diverted from their original channels, and it is clear that his travelled mind was ambitious to preserve, not only the memory of his actual wanderings, but even more—for, after he he had caused imitations to be produced of all the scenes ever visited by him on earth, he ordered an artist to idealise, as is evident from a series of vaults lately unearthed, the phenomena of the infernal regions. Such a palace and such a Cæsar may well have provoked the curiosity of all subsequent time, and especially so when the record is detected on an inscription, "that the curiosities of the entire world are to be admired in collection here." An altogether new light is thus thrown upon the hitherto concealed bye-ways among the foundations of Hadrian's Villa, with its cosmoramic reproductions—of mountains in miniature, valleys such as might be painted on a magic-lantern transparency, and dwarfed reproductions of monuments. Yet Hadrian himself, as these latest revelations demonstrate more emphatically than ever, was a master-artist, inspired to a considerable extent by the Grecian genius, and always tormented by the idea that, in his palace, he would not really produce the effects and imitations he desired. It was a barbarous ambition, toned down by a cultured self-consciousness. Many a long-buried mimic Lyceum, Prytaneum, and Gymnasium has now been dug up—evidencing the extent to which his eccentric ambition rose.

But, perhaps, the most interesting of the new discoveries are those by which—the pedantic part of the vast subterranean ruin being left behind—the domesticity of antique Roman imperial life is reached. Some of it has long been familiar to travellers and to historians, but a large space remained, covered only by conjecture and criticism. It is here that the difficulties of the explorers commenced. They had been accustomed to place the imperial abode and the ruins spreading northward from the well-known group of ruins down to the traditional and mimic Vale of Tempé. As their investigations proceeded, the investigators seceded from this opinion. They came, it was true, upon superb porticos, tower-like structures, with tops resembling those of Gothic pulpits, and magnificent halls; but none of these throw any light upon the private life and manners of a Roman Emperor at that period. Exactly the same remark had applied to the researches of M. Rosa among the ancient Roman villas on the slopes of the Latian and Sabine hills. The state apartments were preserved; but the theory was that the family lived its private life above them—an opinion which might apply to private and comparatively modern dwellings, but not to imperial or noble abodes. The doubt has been justified. Within the cryptic spaces of the palace—and this is a fact of extreme interest—have been traced the foundations and walls of sumptuously-ornamented chambers, hollowed in the tufa rock, or built up of bricks belonging to the most antique dates—for Italy—of that manufacture.

It is not decided, even now, whether Hadrian commenced by constructing this part of the palace for himself, his family, and his favourites, adding afterwards the triumphal groups of structures that are found to rise or be buried around them; but this much is certain, that the materials here used are now pronounced by not unqualified authority, to be the oldest. Among them the private gardens and apartments are almost always reached by subterranean passages, though an opinion is implied that chambers somewhat equivalent to modern nurseries were situated on the highest floors. As has been noticed, however, with reference to the Palatine Hill, the Cæsars often separated their private from their official residences on the Imperial Mount; and that this custom survived in the days of the domestic Antonines. It is impossible, at the same time, not to recognise the fact that the earth has grown up around these palaces, and, as it were, interred them, so that their splendours could only be brought to light by the excavations now nearly completed. It would be difficult to imagine, even as they are exhibited now, fresh to the light and air, after centuries of inhumation, a more brilliant "restoration," so to speak—porticoes, peristyles, buildings of all sizes and shapes, domes of grand saloons, rounded arches, pedimental façades of temples, decorated towers, and trellised terraces spread over large flat roofs—the whole Forum in one, so to speak, and yet possessing the cohesion and uniformity of a single structure inspired by a single mind. Even yet, however, notwithstanding all the illumination which has been kindled amid the remains of this incomparable edifice or *congeries* of edifices, to which the title has been given of Hadrian's Villa, it is difficult—impossible, perhaps—to assign a meaning to all these incessant varieties of chambers and corridors, enclosures and open spaces; still, some lines are distinctly traced, which may as safely be followed. Thus the great reception rooms—or such as, by their magnificence, appear to denote that purpose—were situated in long ranges on the eastern side, but were not attainable except through a series of architectural vistas, effectively contrived—an octagonal vestibule, one of those courts which the Romans called peristyles, of which many examples occur among these bewildering and beautiful groups, though none approaching in elegance of proportion or exquisiteness of work to that to which the name has been given, in a modern taste altogether, of "The Golden Piazza." This, however, with its columns of Cipoline marble and Oriental granite, its pink-marble pavement, and fragmentary pedestals of statues which have disappeared, is a discovery rather perfected than originated during the late researches. Opening from it the explorers have hit upon an immense hall, surmounted by a cupola, and terminated by an apsis of peculiar shape, with niches at the four corners, whence light was received from above—an arrangement well known in the Belvedere of the Vatican, for the perfect exhibition of sculpture. Still, all these superb proportions and profuse embellishments suggested only the idea of halls dedicated to the purpose of imperial audiences, private life being left out of the light altogether. It now is evident that from these led long garden walks, over terraces, through passages partly under ground, to where the Roman patricians took their leisure; and from these again to libraries of Greek and Latin volumes—baths, lined with white marble, about a yard in depth and 18ft. in circumference, small rivulets to relieve the bathers after their somewhat Turkish exercise, and bridges of marble leading from these to a central islet, not a vestige of which was visible among the modern fashionable relics, whereon stood—a circumstance notable—a square hall surmounted by a roof composed of "what architects in the present day call cloister-arches." Around this would seem to have opened alcoved niches, each containing a separate bath; but the whole overwhelmed by a confusion of mutilated marbles—columns, capitals, plinths, and bas-reliefs—Tritons, Nereids, and Amorinos the last mounted, strangely enough, upon hippogriphs, and all these tending towards a gigantic hall now choked almost up to the ceiling with rubbish; yet, where French archæologists of the latest date feel sure that they have discovered not merely the remains of the Lyceum and the Prytaneum, but also those of the private Roman life and manners which have, during so many centuries, lain sepulchred beneath them. There is one section of these despoilments from the past to which has been allotted the designation of "The Hundred Chambers." It is no more, as these fresh reports and documents prove, than a misleading and romantic application of words. But the discoveries do lead up to the fact that there were, beneath these gold and purple palaces, barracks for soldiers and prisons for slaves, concealed from the common sight—one of the latter hewn in the rock, and yet having to be aided by a wall 40ft. high, and 300 yards long—all within the precincts of Hadrian's Villa, which contained also a theatre, a race-course, a lake upon which boats, resembling the gondolas of modern Venice, were rowed, and besides twelve hundred chambers—more than those of the Vatican—dedicated to the fashions and simplicities of private life; but, after all, these discoveries are only varied reproductions from Pompeii, though it must always be a matter of interest the question to what uses, for domestic life, and in what estimation, household art being considered, were these vast fortunes and luxuries of the ancients dedicated? The latest Roman excavations have laid bare, with an average not anticipated hitherto, the Roman life.

THE INSTITUTION OF CIVIL ENGINEERS.

On page 495 *ante*, we adverted to the internal dissensions and difficulties which have recently existed in connection with the Institution of Civil Engineers, and which have threatened to damage the position of that most useful society. It is unnecessary to revert to the late meeting called together to discuss certain alterations proposed by the Council for the purpose of reorganising the Institution, and the defeat it experienced. The desire of the Council was to create a new class of members—"Senior Members or Fellows," as they were to be called, at the upper level of the Institution, to which all members who had been members seven years, and were willing to pay an increased subscription, were to be admitted. The defect of the proposal we have already pointed out; it was partly due to a flaw in the existing bye-laws, under which "Associates" have been admitted who really ought to have been members, as well as those who were outsiders. By improperly admitting engineers to that rank, the Council found out that the Associate class was getting too powerful, and hence arose a desire to split the first rank of members into two sections by creating a higher class of members or "Fellows." The effect of the proposal was clearly to raise a very doubtful distinction between engineers entitled to equal corporate privileges, and to place in a higher rank more fortunate members. We have already expatiated on the result of such a fictitious distinction, and the obvious injustice it would lead to by raising to the higher rank men of larger means, though of meaner ability and attainments. But the mischief sought to be remedied by the Council has been one of long standing, the fact being that the bye-laws and charter of the Institution are not in harmony with one another. The "members" and "associates" were elected before the charter was drawn, and the bye-laws relating to these classes never properly distinguished between the professional and non-professional associates, and hence engineers and outsiders have been indiscriminately admitted. By disregarding the original intention, and by admitting engineers as associates, the Institution instead of consisting of three classes—members, associates, and honorary members—as laid down in the bye-laws, comprise, 1, members properly qualified, distributed between the member and associate classes; 2, members who are engineers, but not qualified for membership; and 3, members not engineers, and therefore not admissible at all. This awkward division of classes has been the dilemma which the Council have had to meet, and they have resorted to various subtile distinctions to make the charter and bye-laws agree. It was under these circumstances that the Council were instructed to draw up a scheme on the basis that the Institution should consist of senior members or fellows, members, associates, and honorary members; but, as we have noticed, the meeting rejected the division, and preferred the original classes. A modified set of bye-laws have now been framed, and it is provided that only those associates who are civil engineers by profession should be entitled to the privileges of corporate membership, and that all present and future civil engineering associates, but no others, should be termed "associate members." Such, then, is the solution of the difficulties which have perplexed the Council so long, due to the fact that the drafter of the charter did not clearly distinguish between professional and non-professional associates. The settlement of the question thus leaves three classes—members, associate members, and associates—but we should have preferred the original titles of members, associates, and honorary members. According to the report just received we find during the past session 95 associates have been transferred to the class of members, and if this rule be kept in view we do not see how any difficulty can possibly occur. If properly qualified engineers by profession be made "members," and the second division be composed of associates enjoying corporate privileges and capable of being transferred to the first rank by after qualification, nothing further is wanting, in our view, to accommodate the two leading classes of the Institution without overlapping in any possible manner. A third class, similar in all respects to the "honorary members" of the Institute of British Architects, would comprise all individuals distinguished outside the profession or associated with it, and become the complement to the Institution. The division of rank in the Institute of British Architects secures the representation of every professional and non-professional class, and we have never heard of any difficulty having arisen, and the same threefold division ought to represent, in like manner, every practicable distinction in and outside the profession of civil engineering.

A complaint, however, has reached us which, if well founded, would somewhat explain the desire of the Council to create a new class of members, but which also reflects a little on the integrity and independence of the Institution. It has been rumoured that the house list issued by the present Council is composed partially of Government and other contractors whose places would be better occupied by independent civil engineers. "What," one complainant asks, "would be said if the Council of the Royal Institute of British Architects proposed that the new Council should consist partly of contractors and builders, although they might happen to have 'handles' to their names?" The same writer says: "It would be satisfactory to know how many times during the last session those contractors who are members of Council have attended the meetings of the Institution." Other members, we learn, who are contractors are not on the Council. If these rumours are based on fact they certainly lend countenance to the recent proposal to introduce a new class at the upper and lower levels of the Institution—anyhow they throw a new light on the subject. We are glad to see, however, by the report just received, that the professional qualification is to become the leading test for those to be elected to fill the several offices in the Council. The following gentlemen have been duly elected for the ensuing year:—Mr. John F. Bateman, F.R.S. (president), Mr. J. Abernethy, Sir W. G. Armstrong, C.B., F.R.S., Mr. W. H. Barlow, F.R.S., and Mr. J. Brunlees (vice-presidents), Sir J. W. Bazalgette, C.B., Mr. G. Berkley, Mr. F. J. Bramwell, F.R.S., Mr. G. B. Bruce, Mr. E. A. Cowper, Sir John Coode, Mr. W. Froude, M.A., F.R.S., Mr. A. Giles, M.P., Mr. H. Hayter, Dr. W. Pole, F.R.S., Mr. G. F. Lyster, Mr. R. Rawlinson, C.B., Dr. C. W. Siemens, F.R.S., Mr. D. Stevenson, F.R.S.E., Sir Joseph Whitworth, Bart., F.R.S., and Mr. E. Woods, other members of the Council. The undeniable principle that should control all professional societies is that of electing independent professional men to fill the highest posts, and we all trust to find that so important an institution as that of the Civil Engineers will do nothing to compromise its well-earned position.

FIVE ELIZABETHAN JOHNS.

The interesting article on p. 554 is wound up with the remark that "information on the whole subject might be amplified by further research." There is no doubt of this, and by it perhaps a settlement of the difficulties attending these names may be arrived at. Is not your contributor rather hard, therefore, on other writers on this subject when he uses the words, "Is it not idle to contend," &c., as if he had settled the point without fear of contradiction? Allow me then to furnish some results of many years' researches to solve these questions.

1. Of Shute, there is nothing further to state. 2. Of Thynne, your correspondent fails to see that he could have been the architect of Longleat (erected 1567-8 to 1578), his own house, because "no mention occurs of the architect or his fees" in the accounts preserved; and again, "that Thynne should have been the designer of this noble mansion is eminently unlikely." Why so? and is not this absence of a name and a fee almost sufficient to decide that he was his own architect? Then it is stated that "by concurrent tradition the design is attributed to John of Padua, and held to bear a close resemblance to the Protector's house in the Strand, known to be his work." Where is this concurrent tradition to be found? Is the Strand building "known to be by John of Padua," as asserted. My replies are that Vertue, Walpole, Dallaway, and Britton have asserted it at a venture, probably in their time knowing no other prominent name to whom to attribute the design; while in referring to "tradition" we must always be careful to observe when the so-called tradition arose. We do not yet know positively who was the architect of Somerset House. As to the resemblance between the two buildings, I have not a good view of Longleat to compare with that of Somerset House, and cannot therefore offer any opinion.

Your correspondent states in his concluding paragraph that he has referred to Cooper's "Athenæ Cantab." A further reference, and he would have met with a statement that might have raised a doubt in his mind as to who had designed Somerset House. Under the heading of "Richard Pallady" (uncommonly like a corruption of the family name of Andrea Palladio, who lived at the same period, having been born 1518, and died 1580), it will be found that he was elected scholar from Eton to King's College, Cambridge, 1533; does not appear to have taken a degree; became overseer or clerk of the works to the Duke of Somerset for his palace in the Strand (commenced 1546, stopped in 1549, but continued to 1556); was committed to the Tower with other servants and friends of the Duke; was liberated; had property in Warwickshire and Lancashire; and was living as late as 1555. Now, in the time under review, supervisor, surveyor, overseer, and clerk of the works, was, as far as is known, synonymous with our architect, which term was then little used. John of Padua had a warrant as "devizor" (not "designer," as is printed). Of the meaning of that term we are still ignorant, and I think it occurs but once again, and at an earlier period. May not Somerset House be in future ascribed to Richard Pallady or Paladye, and so dispose of the tradition (?) that John of Padua was employed by the duke.

3. This John of Padua is really only known by the grant given to him of a fee of two shillings per day by King Henry VIII., in 1544, and again in 1546, in consideration of "good services done to us in architecture, and in other inventions in music." This grant, I must here notice, was given after the now-corrected date of Hans Holbein's death (1543), and in the year that Girolamo Pennachi da Trevigi met his death at Boulogne, both having been employed by that king; and there can be no reason raised why he should not have got an architect and musician from Padua. I would also mention that James Nedam, who signs himself "accountant, surveyor-general, and clerk of the king's works,"

probably died in 1546, and was succeeded in his appointment by Lawrence Bradshaw. They are both little known, but from the rank they held, why may not some of the buildings in question be attributed to them? In fact, they held the office that Jones, Wren, and other celebrated architects held subsequently. Professor Willis, in 1860, suggested that John of Padua and John Caius, Kaye, or Keyes, were one and the same person. The records state he—Caius (the 4th John)—gave "the exact model and pattern to Theodore Haveus, of Cleves" for the Gate of Honour, erected about 1574, the doctor himself dying in July, 1573. And to this painter and sculptor the design of the college has been attributed, while it is also thought the "doctor was his own architect." As John Kaye can be traced from birth to death, is it not curious that there is no concurrent testimony of his being the John of Padua who received the grants from the king, nor, as far as I am aware, of his having had any proficiency in music, though his general learning and his medical and theological talents are much referred to. Besides the two English names I have introduced into this question, I could give some sixteen others employed during the period in question, say between 1544 and 1608.

5. Now of John Thorpe, the only fact that has lately come to light respecting him, in addition to the book of drawings in Sir John Soane's museum, is an entry, under the date of 1590, of a "Plan of the Offices and Buildings of the Palace of Eltham," as made by him. In this book of drawings are several, either made from others, or by himself perhaps, on the spot; hence it may be assumed that he had at least visited Paris. These comprise: the Chapel of Henry VII., begun 1502; Chateau de Madrid, near Paris, begun 1528; Monsieur Jammet's house, Paris, and St. Germains, near Paris, both dated by him 1600; and the queen mother's house, Faubourg St. Germains, which is inscribed "altered p. Jo. Thorpe." Then he gives other names which may be arranged in the order of their dates, as Somerset House, 1546; with a jump as far as we yet know of these buildings to 1560-1565, when Buckhurst house, in Sussex, appears, followed by Copthall, 1564-67; Kirby, 1570-72 to 1590, "whereof I layd ye first stone, A.D. 1570;" Burghley, 1575-80; Wollaton, 1580-88 (disputed for the Smithsons); Wimbledon, completed 1588; Longford Castle, 1591-1612 (said to be "an imitation of one of the King of Sweden's palaces"; or "after the model of the Castle of Uraniberg, designed by Tycho Brahé," as observed on p. 147 of this journal); Potter's Bar, 1596; half a front, dated 1600; Holland House, 1606-7, "pfected. p. me, J. T.;" and, latest, Sir George Coppin's house, Herts, in 1608. There are a few other houses that deserve further research—such as Ampthill Old House (repaired 1545-46 by J. Nedam, "enlarged p. J. Thorpe" (at what date?); Gydde, or Gidea Hall, Essex, for Sir A. Coke; Canons "Lady Lake's House," the predecessor of the magnificent residence of the Duke of Chandos; Lyveden, Northamptonshire, generally attributed, with other edifices, to its owner, Sir Thomas Tresham (1577); Richmond Lodge, to which Thorpe has added the word "Sticles"—a word no doubt perfectly unintelligible to the majority of those who look over the book, but is intended for Robert Stickelles, a professional, who was recommended (1597) for the appointment of Surveyor of the Queen's Works, and designed that edifice; Burghley-on-the-Hill, for the Duke of Buckingham; Heddington, or Toddington (county Bedford), for Jo. Chenyes, before 1580; Thornton College, for Sir Vincent Skynners; and Lullingstone, Kent, for Sir Per. Hart. Whether an inquiry into the history of these houses, and some of the others also named in Thorpe's book, might certify to their having been designed by him, or might rescue other names from oblivion, or some of the present known names be attached to them, requires a search that I have never had the time fully to make. For instance, in the case of Canons, the manor was sold (1604) to Sir Thomas Lake, who died 1630, and his widow in 1642. If the inscription, "My La: Lakes Howse," be accepted as it stands, it would bring the date of the plan down to a very much later period than is ascribed to John Thorpe, the date of whose death I think is still unknown to us. On p. 96 of this journal it is stated that he is buried in the parish church at Wollaton, where a short epitaph records him as a surveyor and builder. Can you print the epitaph in full? Has any one of your readers time to undertake this interesting though perhaps thankless search?—one which must be a labour of love. We know that Thorpe has included many buildings not designed by himself, and there may be many more. To conclude, "We yet require more information concerning them" (these five Johns) "and their productions."

Wyatt Papworth.

INSTITUTE POLICY.

No topic in the address at the opening of the Institute session has attracted so much notice or created a livelier surprise than that of competitions, so emphatic was the opinion expressed by the president against them. The sum of his argument is, that if you stick to plans, the wrong man may be employed; "heart-burnings, disappointment, and jealousy" are the consequence, or in the president's metaphor, "the children" of the competitive system. The unearthing and recompense of merit by its means is a specious idea, "emanating from some malicious sprite, who joys in our distress and our divisions." A successful competitor would hardly be so figurative, but coming from the chair the sentiment may be accepted, less as the speaker's than that of the body he represents. In this light it may be viewed as a declaration of hostility, from the oligarchy of names, against the republic of works, intimating that the policy of the Institute is not so much for the welfare of the many as the preferential advancement of a few. The president relates, that upon his advice the Hove commissioners lately waived an intended competition in favour of choice by name. Six were submitted to the vote, and the selection devolved upon a gentleman of the first pretensions certainly, and one must believe, unconscious of the proceeding, but a member withal of the Institute Council. *Ex uno disce omnes*, it is said; or, as a commercialist of the curbstone asserts of his toasting forks, "the article recommends itself." Should the plan be as generally followed as Mr. Barry thinks it ought to be, happy is the dole of him who sits at the council table. The founders were not without reason in selecting for their central figure a distinguished layman, free from self-interest in the measures of his colleagues, and the circumstance may be advantageously kept in mind. The assumption of eclectic powers may be easy, but their exercise in matters affecting the whole profession can hardly fail to become obnoxious.

Private patronage being more general than public, commissions are mostly given on personal grounds. They are often conferred also from the estimation in which previous works of an architect are held. This cause is the most complimentary of all, and chiefly conduces to those leviathan reputations that occasionally grow up. It is a fact worth notice, that except in the case of Sir Robert Smirke, who declined works under £10,000, there are few records of architects foregoing commissions on the score of preoccupation. Professors are as ubiquitous as the wind, as active as Mercury, and it had been almost said, as insatiable as the Horseleech's daughters. Thirdly, comes the test of fitness by specific designs, and here it is gratifying to know that the sons of Sir Charles Barry occupy a pedestal, with name on one hand and work on the other, from which they may be supposed to regard with equanimity the claims of both. Name has overcome for them the inertia that impedes men generally, whether in the arts or in the Church; but work, be it remembered, was the parent of name. Half a century or less ago the founder of their celebrity was, above all men, powerful in destroying the fabric of monopoly into which patronage, public and private, had long and copiously been used to flow. The spectacle, therefore, has the strangeness of which fact is so largely susceptible, when his immediate issue declares convictions that must soothe the shades of Hardwick, Smirke, and Soane! But let the bias of the present chiefs be one way or the other, the innovation made with national sanction in the case of the Houses of Parliament, where the father bore the palm from a hundred competitors, has been too frequently confirmed, and is now too deeply rooted to be suppressed by the son. Were the Institute to ordain the extinction of the system to-morrow it would simply deprive its members of a large amount of business. Wherever employers are concerned to know who best understands and meets their wishes, they will resort to more or less open competition by plan. Ordinances for the proper regulation of such concurrences will therefore be of greater use than attempts to stamp them down. But though full respect be entertained for the zealous aspirations of her junior followers, let it not be thought that architecture is to be vocationally assumed *per saltum*. Putting design in the very foremost place, it is but one of many combined requirements the accomplished architect should possess. The acquisition and blending of artistic and practical elements can be effected only by gradual means and patient application. The president's best point was the inculcation and praise of perseverance. But what, under present regulations, is the prospect of one who takes that virtue for his motto? He will probably find himself denounced a plodder, and see his proper place usurped by the neophyte of an easier school, coming few know whence, and of his antecedents *nil*—who pronounces the modern shibboleth of fame as though born with it upon his tongue. Rapidly he makes his flesh-pots sure, enters the conclave of architects by the gate of wisdom, and finds the Institute a smiling haven of success, deriving no insignificant support from a large and profitable class whom in return it systematically ignores. Who would not say, for instance, that the associationist has a far better chance of promotion than the associate? The one of these societies affects to regard the other as a subordinate and feeder, but the medium of supply must ultimately exercise a regulating voice and become a House of Commons to the realm architectural. This is not unlike the estate of the Church in the last century and early part of this. Abundance for all was converted by mismanagement into plethora for some and starvation for the rest. Such an anomaly has been overcome in one case, and might be in the other with similar benefit. Here the Institute might perform a good and wholesome work, but the council must first cease to regard themselves as Aaron's rods of the profession, appointed only to consume their less appreciated brethren;

they must be content to copy the policy that has proved so beneficial to the rank and file of the clergy; must promote the personal performance of duties by those who take the emoluments of office; have courage to look in high quarters, and set, in the first place, their own house in order. It is surely preposterous that the official recipient of thousands should beset the broad avenues, and even the bye-ways of practice, to wrest their meagre opportunity from his unsubsidised fellows. Considerations of this nature would not be readily exhausted, but these remarks are restricted to a simple indication of reform that would promote respect for architects, and open to their art a path of advancing excellence.

Not in the Groove.

ROYAL INSTITUTE OF BRITISH ARCHITECTS.

An ordinary general meeting of the Institute was held on Monday evening, the President, Mr. Charles Barry, in the chair. The following elections took place:—As Fellows: Thos. Chambers Hine, F.S.A., Nottingham; Geo. Gilbert Scott, M.A., F.S.A., Duke-street, Portland-place, W.; John Wynne, Manchester; Geo. Bell, Glasgow; William Millican (President of the Leicestershire Society of Architects), Leicester; H. L. Florence (President of the Architectural Association), Verulam-buildings, Gray's-inn, W.C.; and George Wilkinson, Dublin. As Associates: C. A. Monday, Croydon; Herbert Augustus Keate Gribble, Colville-terrace, W.; Wm. Wiseman Kendall Clarke, Stratford-place, Oxford-street, W.; H. G. Brace, Richmond Villa, Westhall-road, Lordship-lane, S.E.; Hy. Tanner, St. Paul's-road, N.W.; F. E. Eales, Welbeck-street, Cavendish-square, W.; Stanley F. Williams, Buckingham-street, Strand, W.C.; H. Bland Rowlett, Wyndham-street, Bryanston-square, W.; and R. E. Pownall, Aberdeen-place, N.W. As Hon. Associates: William Henry Barlow, F.R.S. (Vice-President of the Institution of Civil Engineers), 2, Old Palace-yard, S.W.; John Hopgood, 17A, Whitehall-place, S.W.; William Southcote Inman (past vice-president), 14, Montpellier-villas, Brighton; Lord Elcho, M.P., 23, St. James's-place, S.W.; Sir James Watson, Glasgow; Robert Bruce Bell, M. Inst. C.E., 203, St. Vincent-street, Glasgow; Lieut.-Colonel George Chesney, R.E., Assoc. Inst. C.E. (President of the Royal Indian Engineering College), R.I. Engineering College, Coopershill; the Right Hon. Henry Howard Molyneux Herbert, Earl of Carnarvon, D.C.L. (President of the Society of Antiquaries), 16, Bruton-street, W.; John Murray, 50, Albemarle-street, W.; William Harry Rylands, 51, Lincoln's-inn-fields, W.C.; Sir William Earl Welby Gregory, Bart., M.P., Denton Hall, Grantham; William Hardman (Chairman of the Surrey Sessions), 81, St. George's-road, S.W.; Hugh Leonard, M. Inst. C.E. (late Chief Engineer of Bengal), 28, Conduit street, W.; Lord Henry John Montagu-Douglas-Scott, M.P., Palace House, Beaulieu, Hants; John Penn, Assoc. Inst. C.E., Greenwich; Very Rev. Edward Meyrick Goulburn, D.D. (Dean of Norwich); Henry Charles Coote, F.S.A., Walwyn House, Richmond-road. West Brompton.

The President remarked that 33 members had been elected that evening, a number unparalleled in one night, he believed, in the history of the Institute. He further mentioned that a reply had been received from Mrs. Cockerell, acknowledging the letter of condolence which he had written to her in the name of the council and all the members. Donations to the library having been acknowledged with thanks, the President said that as the patron of the Institute, the Queen, was now in deep sorrow, the council had thought that even from the Institute some expression of sympathy with her Majesty in her bereavement might not be unacceptable, and they had accordingly agreed to a motion of condolence.

THE HIGH SANCTUARY AT JERUSALEM.

A letter from Lieut. Conder, R.E., was read, replying in detail to the criticisms of Mr. Ferguson on his paper read at the previous meeting (see pp. 582-3). He combatted Mr. Fergusson's theory of Herod's temple site, plan, and dimensions, referring to the various investigations on the surface and in shafts carried on by the Palestine Exploration Committee since Mr. Fergusson propounded his views, and asserted that those theories were incompatible with the remains. Mr. Fergusson had declared the inscriptions on the dome of the rock to be forgeries, but it was unlikely that false dates would have been written up several centuries later in the Cufic and Arabic languages.

Mr. Fergusson, in reply, said there was not one point he had advanced that had been controverted in any way, and he still maintained the entire correctness of the theories advanced in "The Temples of the Jews." He complained that Lieut. Conder and Captain Warren had never given reference to the chapter and page of my authority they quoted, so that there were no means of checking their statements. If Lieutenant Conder's views as to the ancient character of the Dome of the Rock were correct, how was it that while the surrounding walls had often been injured by shocks of earthquake, and as frequently repaired, there were no cracks visible in the dome itself? It was not safe to rely on isolated statements of Josephus and the Talmud, for they frequently contradicted each other. The supposed rock levels mentioned by Mr. Conder had been completely refuted; there had been, indeed, not a single objection proved to anything he had written on the subject.

Mr. Crace, as a member of the Palestine Executive Committee, wished to ask a few questions of Mr. Fergusson, remarking that he had no theories of his own. How did he account for the angle stones at the south-eastern corner of the Haram enclosure being marked with Phœnician characters not more recent than the time of the Herods? If the porch of the Temple did not extend so far east why were these stones placed there, and if not the portico, what did they support? He referred to the measurements of Ezekiel, and said that with a cubit and a hand's-breadth of 22in. these nearly agreed with Lieut. Conder's statements as to the existing wall. By Ezekiel xliii., 12, they saw that the most holy place was on the top of the mountain, and therefore could not be where Mr. Fergusson put it. An objection to Mr. Fergusson's theory that the Dome of the Rock stands above the Holy Sepulchre was that the Crucifixion would not have been allowed to take place within 100 yards of the Holy Temple, nor would a burial place have been permitted to be made so near. In 1874 it was found that the reputed Church of the Sepulchre in the city actually stands above a series of tombs. The outer walls supporting made earth might easily be shaken down by a shock which could not disturb the Dome of the Rock.

Mr. Maynard supported Lieut. Conder's view, remarking that as the Temple of Solomon was built on the site of a threshing floor it was presumably on the highest point of Mount Moriah.

Captain Burton entirely agreed with Mr. Fergusson as to the migration of holy places. The site of the conversion of Paul was gradually edging from the ancient road between Jerusalem and Damascus to the modern French route. There was not a single site in Jerusalem on which he could place the slightest reliance.

It being 9.30 p.m. the President suggested the adjournment of the discussion, and called upon Captain Burton to read his paper upon

REMAINS OF BUILDINGS IN MIDIAN.

The lecturer confined himself in his short address, which was delivered with but scanty references to printed notes, and with considerable fire and vivacity, to a narrative of his two expeditions in the Land of Midian. The mines, monuments, and ruins then explored were described in detail, and the mineralogical and geological features of the country formed a main topic of the paper. The Land of Midian begins, he explained, northwards with the Fort of El-Akabah (in N. lat. 29° 28′); and, subtending the seaboard, extends south to the Fort of El-Muwaylah (N. lat. 27 40′), having therefore a length of 108 direct geographical miles. This country he called "Madyan Proper," or "North Midian," in opposition to "South Midian." The latter section would stretch from the Fort of El-Muwaylah as far as the Wady Hams in N. lat. 25 55′, or 105 miles. Midian, both north and south, forms the easternmost province of Egypt. Even considered mineralogically, the land falls into a two-fold division; in Northern or Upper Midian, the ancient Egyptians mined for copper, while the Nabethæans and their successors worked Southern or Lower Midian chiefly for gold. The whole tract is a prolongation of the great Hauranic Valley (Auranitis); of the land of Moab; of the Nejeb or south country; of Idumæa, which the Hebrews called Edom, and of the classical Nabathæa, whose western capital was Petra, the Rock. Midian is, and ever has been, inhabited by a mixed and kindred race of citizens and Bedawins. Situated on the ancient "overland route" between India and Southern Arabia, and Phœnicia and Egypt, the inhabitants would adopt the style of building chosen by the races that lived under similar conditions on her northern border. The materials used were the limestone found on the seaboard, and extending some distance into the peninsula. For temples, palaces, and houses the finest alabaster, both plain and variegated, was available, while the gypsum served as cement. Commencing with the ruins in North Midian, Capt. Burton remarked that while the fort and settlement of El-Akabah at the head of the gulf had been often described, the traces of the ancient Elath at the very head of the bay had not been alluded to. They are now called El-Dar, and consist of large blocks of cut stone covered by sea water, and mounds and tumuli inland. To the north he found the smiths' quarter, thickly strewed with scoria, glass, sherds, and slag, probably the *débris* of the treatment of copper. Seven miles from El-Akabah is Pharoah's Isle or Tibil-el-Kalah, a long oval rock, upon which are several strata of building. The mass is evidently European, built when the Christians and the Crusaders held El-Akabah. Apparently it rests upon Roman ruins, and the latter upon Egyptian remains of far older date. The upper part of the fortification is attributed to Saladin, A.D. 1167. The uppermost masonry and the embrasures are rude in the extreme. 17½ miles inland, north by east, is the ancient capital of the country, now called Maghair Sheuayb. It consists of a high and low town, both fortified and containing extensive ruins of masonry. In the high tower he found foundations of a fortified monastery or palace, of decaying gypsum, walls, conduits, frusta of columns, and handmills and mortars. On the left bank of the wady below was a mound of dark earth marking the smiths' quarter; here there were remains of tall furnaces and coins of Midian, for the first time discovered *in situ*. Beyond this are traces of crowded dwellings, and outside a huge cemetery—mere pits in the ground, many yawning wide, and all the ancient ones ignoring orientation. On the edge of a slope were the only remains still existing; they were a mediæval fort and dwelling, and are to be restored by the Egyptian Government, who have sent an engineer, Sulayman Effendi, from Suez to report thereon. Along the right bank of the wady were more extensive remains, extending over two kilometres, marked out by the bases of gypsum walls of forts, cisterns, and settlements, by broken pottery, and glass fragments; behind was a series of rock-hewn catacombs. These burial places might be divided into four sets—first the so-called "Tombs of the Kings," with entrance doors, and ornamental cornices and crenelles on the front, and irregular upright recesses and horizontal loculi within the passages. Then there were two sets of buttressed caves, in which were found pilasters with rude Ionic and Doric capitals. The fourth set were outliers, small caves cut in the sandstone. All the tombs appeared to have been ransacked by the Bedawins; the only "finds" that rewarded the author were mouldering bones, bits of marble and pottery, and dry seeds of the rose of Jericho. Going south from the ancient capital of Midian, he visited the pilgrim station of Aynanah, a maritime settlement with extensive waterworks, well elevated cisterns, and an aqueduct three miles long, built of rough stone and cement, and lined on the waterway with baked and eared tiles. The aqueduct heads in a gorge, where the upper waters

were collected in a lake, and here had stood a double row of furnaces and the miners' huts. This was the general disposition of settlements in maritime Midian—the mine-owners lived on the seaboard, and the miner-slaves near the works. At Shatna—another pilgrim station, 7 miles south—he found, on the right bank of the wady, a ruined workmen's village of bothans, 12ft. × 8ft., traces of a fort and furnace, and other foundations. At a third station, Tiryam, were remains of a townlet, formerly defended by a tower and bastions, and on digging into the mound he turned up various shells, sheep bones, and palm charcoal, "cooked" pottery and glass of surpassing thinness, iridised by damp to rainbow hues. Near Fort El-Muwaylah, on the southern frontier of Midian Proper, were vestiges of ovens and heaps of copper and iron slag, and the foundations of a ruin, 20m. × 16m., built of large pebbles, and composed of one large and several smaller stones, defended by a revêtement of boulders. Passing on to the second section of his paper, the ruins in South Midian, Captain Burton said the mining remains were much more considerable here than in Midian Proper, and gold was the principal metal worked. Four days' journey south by south-east from El-Muwaylah was the ancient mining town of Shuwak, which he identified with the Soaka of Ptolemy. It was situate on a large island in a wady, and consists of foundations of blocks of buildings divided by mounds and tumuli of loose soil white with salt, and near by were some rude catacombs. The furnaces were of the ordinary type, built of firebrick and Hisme stone, and although he found ashes, pottery, and scoriæ, all the metal had been removed. Water had been stored with immense labour by half-a-dozen aqueducts, mostly channelled with rough cement, overlying fine concrete, communicating with tanks. One of the aqueducts subtends the left side of a valley; where it crossed a gully the arch was formed of projecting stone tiers, without sign of a key. Below the town is a wall 1,000 metres long, and around ruined parallelograms of every size. We left Shuwak, said the lecturer, considerably posed, puzzled, and perplexed by what it had shown us. A little pottery had been picked up, but our diggings had not produced a coin, or even a bit of glass. The evidences of immense labour are the more astonishing when compared with the utter absence of what we call civilisation. The Greek and Latin inscriptions of the Hauranic cities declare their origin—these, absolutely unalphabetic, refuse a single hint concerning the mysterious race which here lived and worked, and worked so nobly. And, finally, who were the Moslems that succeeded them in a later day, when the Hajj-caravan, some three centuries and a half ago, ceased to march by this road? How is it that the annalists say nothing of them—that not a vestige of tradition remains concerning any race but the Nazarenes? About 7 miles from Shuwak is Shaghah, where he saw remains of several great squares, some aqueducts, and many abundant signs of ancient metal working. The quartz seems to have been brought from the mountains to Shaghah to be crushed, and then transported for roasting and washing to Shuwak, where water was more abundant. Another series of explorations was conducted from El Wijh, 86 miles south of El-Muwaylah, as a centre, to three great mining centres. Umm-el-Karayat is a crater-shaped hill of white quartz, containing veins of schist, which have been worked out for gold. At the foot of the mountain a number of rude groining implements of granite were found, and the remains of buildings and of furnaces. North of this is Umm-el-Harah, another great mining centre, where he saw for the first time an open mine scientifically worked by the men of old. The mine is very shallow, and the sloping roof is supported by pillars of rock. The quartz-crushing implements are of three kinds: coarse and rough basaltic lava for the first and rudest work; red granite and syenitic granite for the next stage; and, lastly, an admirable handmill of the compactest grey granite, smooth as glass and hard as iron. Around the pin-hole are raised and depressed concentric circles intended for ornament; and the "dishing" towards the rim is regular as if turned by machinery. All are nether mill-stones, carefully smashed. At Bada (the ancient Badis) were discovered traces of a settlement but no mining, except scatters of quartz, some containing fragments of pure lead. In the Wady-el-Hamz the author inspected the remarkable ruin known as the Gasr—a Roman building of pure style, built of streaked alabaster, and standing on a base of sandstone slabs. Broken corners have been supplied by hydraulic cement, and flaws have been remedied by letting in cubes of sound stone. There are crampholes for metal which has been stolen. The building, which seems to have been a temple, was square-shaped, and had near the south-western angle a projection which Mr. Fergusson had considered as the base of a niche. Two rounded pilasters remain in the enceinte wall, and close by were bases, drums, and the capital of a column, which appeared to have been turned rather than chiselled. The lecturer conjectured that the monument belonged to a Roman invasion of about the days of Ælius Gallus. In conclusion, the discovery of the mine El-Marwah, the northernmost of the gold diggings known to Arabian geographers, was described.

At the close of the lecture the President proposed a vote of thanks to Captain Burton, and announced that at the next meeting of the Institute, to be held on the 13th January, the discussion on Captain Burton's paper, and, if time allowed, on that of Lieut. Conder would take place.

ARCHITECTURAL ASSOCIATION.

ORGANS IN CHURCHES.

We conclude from p. 610 in last issue a summary of the lecture on Organs, delivered by Mr. Somers Clarke, jun., at the Architectural Association, on the 6th inst.

He would next consider the advantages and disadvantages of a transept. This feature may cut the longitudinal axis of the church in one of two places—east or west of the entrance to chancel. In either position he regarded a transept as a mistake, because it is sacrificing the convenience and use of the building to effect. With a transept east of the chancel gates, far from finding support for the voices, there is the worst of all arrangements—a large space behind the speaker, reader, or singers, as the case may be; with a transept west of the entrance to chancel, immediately at each side of the voice or voices, is a lateral space, and if the roofs of nave and transept intersect, the voices are quite early in their career down the church led to either side, to the complete sacrifice of the western part of the nave. On the other hand the organ is nearly certain to sound well when standing in a transept, for the same reasons that it sounds well if placed at the west end; but contrawise the connection between the player and the choir is difficult to maintain. An instance of good transepts east of the chancel entrance is the church of St. Columba, Haggerston; but here the transepts are so shallow that they are hardly more than a pair of great shallow organ recesses, and on plan the church does not show transepts external of the narrow aisles. On the other hand, at the new cathedral at Edinburgh, where no adequate structural provision seems to have been made for the organ, so as to use it with the choir sitting in the eastern arm of the cross, it has been decided to place the stalls under the centre tower, so as to bring the singers and organ as much together as can be managed. Consideration of a chancel aisle for the organ may be dismissed with the remark that a flat or nearly flat-roofed aisle should not be less than 23ft. or 24ft. high; as has already been implied, a good organ-chamber will at least be equal to the continuation of the nave aisle. Then comes the question, shall we divide the organ? Every one who knows St. Paul's Cathedral, All Saints, Margaret-street, or St. Mary Redcliffe, at Bristol, has seen what a divided organ is. With modern mechanical appliances, dividing the instrument is a question of money only, and not at all of feasibility. Although not much used in that way, it is evident that for antiphonal singing this arrangement is excellent, and indeed, if well considered in plan and section of building, the speaker doubted if any arrangement can be found superior to this. In churches the section of which is of considerable magnitude, carrying the organ on brackets from the wall, and at some little elevation from the ground, can be taken into consideration, but the modern "average organ" is of such build that this bracketting cannot be done without inconvenience, unless also some recess in the church wall is made which shall take the more cumbrous part of the machine. A large and well-known example of a hanging organ is that at Strasburg Cathedral. It has all the pipe-work in the case, but the bellows are in a little projection from the triforium. The organ at Ely is, not more than half of it, in the visible case; a good deal is stowed away in the triforium, but this may be regarded as one of the most beautiful instruments in this country. At St. Paul's Cathedral all the pedal organ is behind the walls and not in the two cases, whilst the blowing apparatus and bellows are in the crypt. A great deal of consideration must be given to the convenient arrangement of the instrument in such a position. For musical effect bracketting out is often very successful, as it brings the bulk of the pipe-work fully into the open, and gives the sound abundant room to spread. The next point arising is, Shall we place the organ on the floor or raise it up? He was somewhat doubtful of the benefit to be obtained by raising the organ, but it should not, of course, stand low. When the organ is above the tops of stalls or in a gallery there is often not that complete unity between it and the singers that might be wished. There are frequently also difficulties in communicating between the player and the singers when one is above and the others below. A long movement enabling the organ to be played from or close to the choir stalls can be had, but lack of money is usually a conclusive termination to dreams of this sort. As a gallery arrangement nothing could be more picturesque, or for organ sound be better, than that adopted at St. Agnes', Kennington, but it is most inconvenient for the player, and it is doubtful whether any arrangement in a church of this size could, on the existing lines, be made commodious. The organs placed in our cathedrals are the commonest instances of gallery organs. In almost all cases they stand on a floor 18ft. or more from the ground, but the buildings being so much larger than the churches which we are likely to be called upon to build, difficulties are more easily surmounted than would be possible within a limited area. He would suggest that a couple of speaking-tubes starting from the organ and carried north and south, one to each set of choir stalls, might be of use to communicate between organist and singers, thus obviating the need for passing about of messages on mysterious pieces of paper, which from time to time seem unavoidable, even in the best regulated choirs. It may be added that the best floor for an organ is one of wood, that windows near or behind the organ are a source of damp, chill, and danger to it; that a coil of hot-pipes near or even inside it is frequently of use to keep it in tune, for the space in which the instrument is cannot be kept too dry; this chamber is best lined with wood and cased below the rafters with plaster or wood. An open roof unless at a great height above an organ is a great mistake. Another question is, are we likely to have a blowing engine, or to have the organ blown by hand? The water now much used for blowing is a most convenient and noiseless little servant, and will patiently work away in a cellar, vault, or any odd corner; but the consumption of water is often an expensive item in accounts. Gas-engines are also used for the same purpose. Where, as in most instances will be the case, hand-blowing is adopted, it is desirable to get the blower and the handle at which he pumps out of hearing; but unless there is a near prospect of blowing by machinery, it is not fair to put the blower's handles in the vaults or regions unknown. Provision can be made for an engine in any case, for it is now usual to have hand-blowing as well as machinery to the same organ. It should not be forgotten that much of the good effect of the organ will depend upon whether the player is able or unable to ascertain the effect he is producing. The next matter to be considered is the organ-case—to architects of considerable importance, and indeed of no little moment to the instrument itself, as its form may much diminish the openings from whence

the sound pours into the church. We all know those dignified old cases in which most of our earliest English organs of the 17th and early 18th century were enshrined. Numbers of them are gone, destroyed by Vandalic restorers. They were not built on very true principles, some such, for instance, as that at St. Paul's Cathedral, were excessively solid, and without apertures; but it is superlatively painful to see a stately old fabric such as that which formerly graced the west end of St. Mary's Redcliffe, give place to a mere row of tailboys, a regiment of zinc chimney cans, and which are not, as a rule, on truer principles than were the old cases. According to theory each pipe in an organ should stand on the soundboard, and not be placed at some little distance from its brethren, merely for show; but it is in most cases an advantage to remove some of the largest pipes from within the instrument and place them where they have unlimited speaking room. A consultation with the organ-builder, and a thorough understanding of how he lays out the plan of the various departments of the instrument, will enable the architect to arrange the case so that it may be at the same time truthful and ornamental. If we take a row of pipes we shall find that as each one rises in the musical scale it diminishes in size and length. When, therefore, we see in the pipe-stack case, beloved by the modern Gothic mind, that there is a tall pipe in the middle, and others diminishing in exactly corresponding lengths on either side, we see almost to a certainty what is not true. Some of these pipes are longer than they really ought to be—each of one-half; a part of the pipes is sham. If we go behind we shall see holes cut in the backs of these pipes to prevent the length of vibrating column of air within being over its due proportion. There is no reason why woodwork tracery should not enter largely into the making of the case, and in many instances pipes may be arranged in two or three stories above one another, and represent the internal construction of the organ. The scroll work seen immediately above the pipes in early English cases not only gives richness to the skeleton, but masks the unequal lengths of the pipes, and brings the design into symmetry. This device is common to the greater part of Europe. In Italy, however, the case is considerably taller than the longest pipe that is to be shown, and is more like an open temple front or a piece of very open Renaissance screenwork, with the pipes standing inside, and displaying the inequality of their real length quite honestly. The lines of the case are usually very defined, and consequently the unequal length of pipes is not disturbing or inharmonious. In Spain all churches of any importance have two organs, and very sumptuous the cases are—covered with carving and gilding. At the top of the solid panelling of the lower part of the case, and immediately below the vertical pipes, an armoury of trumpet and other reed stops bristles forth, supported horizontally by iron rods or brackets. The effect is curious and not unpleasing, but it is essential that the organ should, as it usually does, stand in a gallery. In small churches these reed stops project as much as one-third across the church, and with no ill effect. In conclusion the lecturer remarked that he had not even touched upon the historical or archæological sides of the question, or upon the architectural study of examples, or the adaptation of the organ to old buildings. The subject was immense, and there were, indeed, very few machines of man's invention more complex or wonderfully interesting than the organ—the king of musical instruments.

Mr. H. H. Statham moved a vote of thanks to Mr. Clarke for his paper, from which there was much to be learned. As an amateur player he should like to make one or two remarks partly in criticism and partly in supplement. He did not share in his objection to a large instrument. There was a pattern and regulation church organ, of which it seemed as if the firms who used to be the principal builders had made them in 300ft. lengths, and cut as required; they had neither tone nor beauty. English organs were too often deficient in room in the pedal portion. He was glad to hear the condemnation of organ-chambers; the worst thing that can be done with an organ was to box it up. The reason the cathedral organs sounded so well was because they had plenty of space around. The instrument needed to be protected against changes of temperature; there should be no large windows behind it, and the proper treatment of the blank space behind would afford scope to the invention of the architect. Mr. Clarke had proposed to raise the organ, but the first organ-player in England at the present time—he referred to Mr. Best—had told him that the instrument should be put as low as possible, and that he should prefer it under a grating below the floor. It was a great mistake to raise the organ too high, on account of the loss of resonance thereby occasioned. The best material near an organ was wood; neither stuffs nor curtains should be allowed near it to deaden the sound. Architects often left the pipes in too rough a state. Very great care was needed in placing the large pipes, first for æsthetic reasons, and then so as to shorten the conveyances and lessen the chance of leakage of wind, and also so that these should not swallow up all the wind to the injury of the smaller pipes. He liked the frank way in which the Italians treated the pipes; the plan had been followed by the late Professor Cockerell at St. George's Hall, Liverpool, where the case had a decided tone, preventing raggedness. The separate treatment of the choir organ, seen in old examples, gave point and picturesqueness, and it would be desirable if that arrangement were resumed. The organ-blower ought to be out of sight of the organist, but he ought not to be treated as if he had no soul to be saved, and be put where he could not hear the service. The organist ought to be away from the organ. The electric action was the most perfect contrivance, but was expensive; a useful and inexpensive arrangement was one by Bishop, which did not easily get out of order.

Mr. C. M. Hudson seconded the vote of thanks, and spoke from practical experience as an amateur organist of the disadvantages of being boxed in with the organ and the blower. The architect did well to make larger provision of space than was absolutely required, so as to allow of subsequent additions.

Mr. Norbury, as a builder of organs, confessed to liking to see a grand big instrument, and regarded a west-end gallery as the best position for it. He shared the previous speaker's objections to an organ-chamber. The object of placing the high pipes in the centre was to hide the swell-box behind. It would be well if architects would study the organ cases of Spain and Germany before designing. We had in this country no old examples of Gothic cases of any size. The organist ought to sit near the choir, and to have speaking-tubes for communicating with them. The electric action had been commended that evening, but it sometimes failed.

Mr. Potter asked for information as to the best roof over an organ. He was inclined to say a circular coved one, similar to that at the Crystal Palace.

Mr. Riddett thought the cases were very few where on coming away from church one could say he had heard too little of the organ. He approved of the old-fashioned organs. A good plan was to have a small organ beside to accompany the choir, and a large one for state occasions at the west end—an arrangement which he had seen at the Church of St. Roche, Paris.

Mr. F. Bramley Baker mentioned the Church of St. Barnabas, one of the earliest modern Gothic buildings, as a bad example of suffocating an organ in a chamber too small for it.

Mr. Spencer Nottingham referred to the advantages of separating the "state" and choir organs, and suggested that the organ-chamber ought to be on same side of church as the vestry, to allow of consultation between the organist and clergymen before the service. Too often a church was "over-organed." The organ should be elevated rather than depressed, and ought not to be put in a transept, because of the difficulty in hearing it thereby caused to the choir.

Mr. Walter Spiers remarked that when a church was restored or built the erection of an organ was frequently postponed, and when further funds came in the ideas of the congregation were frequently enlarged, so that the chamber was found too small. He should have liked information about organs for village churches seating two or three hundred people. Was it better to get an American organ when less than £1,000 could be set apart for an instrument? He related an anecdote concerning a clergyman who, with the aid of the village carpenter, built an organ which had only one stop.

The President, in putting the vote of thanks to Mr. Somers Clarke for his paper, coupled with it, at the suggestion of the last speaker, thanks to Mr. Norbury for the loan of a series of coloured views of organs in Continental churches, and asked Mr. Clarke for information concerning the numerous organs to be seen in some Italian cathedrals—at Milan there were four, and at St. Mark's, Venice, as many as six organs.

Mr. Somers Clarke, in reply, explained that he had used the term "monster," against which Mr. Statham protested, relatively. If an instrument occupied a fourth of the space in a church he felt justified in regarding it as a monster. It was true that German instruments were, on the whole, better than English ones, but they would be found, on examination, to have extraordinary deficiences in the mechanical adjustments for couplers. The material surrounding an organ was very important, but not very practical, as it was seldom the architect had any choice in the matter in a church; he must endeavour to get a plaster ceiling, as it was seldom a groined roof could be obtained. The objection to an open-timbered roof was that the interval between the internal and external surfaces was so thin. When the Albert Hall was being finished, Mr. Willis suggested that the finest thing would be to have a plaster floor and walls and roof. Some approach to this existed in St. George's Hall, Liverpool, but although the effect was very astonishing it was musically regarded far from being perfect. He could not agree with the opinion expressed that the largest pipes should be arranged at the sides, although this might be done, and referred to Strasburg Cathedral where a small choir organ was placed over the lowest part in centre. He feared that if they could have the small old organs of which Mr. Riddett approved, they would find them screaming little nuisances. The idea of having a small organ to accompany the choir, and a great one for "flares up," was very grand, but the scheme would be absurd in the small churches of modern times. He must admit that the electric action of organs was often a failure. An organ of one stop would be most doleful; he was an apostle of brass instruments, and should prefer, instead of such an organ, a return to the euphonium and violoncello. A good organ could not be obtained much under from £300 to £1,000. Where there were more than two organs in Italian churches the others were for services in the chapels.

The stonework of the Caledonian Railway-bridge over the harbour at Glasgow has now been completed by the laying of the upper courses of the eight buttress-turrets which spring from the tall granite piers. The eight granite half-turrets are to be crowned by a series of lamp groups, constructed by Messrs. M'Dowall, Steven, & Co., Milton Ironworks, Glasgow (London warehouse: Steven Bros. & Co., 35, Upper Thames-street, London). A candelabrum of four lamps, resting on a massive scroll tripod, which lifts the central light to a height of sixteen feet, forms the general design of a group. Springing from the same base as the mid lamp, which is supplied by a handsome fluted and wreathed column, three brackets, adorned with imitation foliage, bend outwards and upwards around the middle lamp. Every lamp is globular, is four feet in height, and has a diameter of twenty-eight inches, or the circumference of fully seven feet. From their great elevation above it the thirty-two lamps, each containing several jets, will not only add to the illumination of Glasgow-bridge, but will form at night excellent beacons for vessels passing up the the harbour.

The Cardiff Town Council considered on Monday plans prepared by their engineer, Mr. Williams, for the better drainage of the central part of Cardiff, practically comprising the old borough. By these works, which are estimated to cost £8,000, it is intended to prevent the serious floodings of Newtown, Temperance-town, and Bute-town. The plans were approved, and the borough engineer was instructed to obtain tenders.

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ADCOTE, SHROPSHIRE—NEW CITY BUILDINGS, FENCHURCH-AVENUES — PREMISES AT 96, NEW BOND-STREET — A DINING-ROOM—MESSRS. JAMES EPPS AND CO.'S STEAM COCOA MILLS — NEW NATURAL HISTORY MUSEUM — DESIGNS FOR TRURO CATHEDRAL, BY J. P. ST. AUBYN.

OUR LITHOGRAPHIC ILLUSTRATIONS.

TRURO CATHEDRAL.

The plan of this cathedral was designed by Mr. J. P. St. Aubyn to suit a very narrow site; the total length of the building being 235ft., and the width 64ft.; the choir, 72ft. long and 28ft. wide, with an apsidal termination surrounded by a vaulted aisle; the choir is 65ft. high, and is raised nine steps above the level of the nave floor. This elevation, assisted by the natural run of the ground, allows of the construction of a crypt at the east end available as sacristies, and for which the site gives no facilities in the usual position. The central tower, 32ft. square, is surmounted by a spire, in all 250ft. high, from which project short transepts. The nave, 105ft. long and 25ft. wide, has side aisles of the same length and 12ft. wide, divided from it by arcades of six arches. The western towers, 150ft. high, terminate the aisles to the west, between which is the principal west entrance, surmounted by a wheel window lighting the west end of the nave. The nave, including the clerestory, is 70ft. high, and has lofty clerestory window of two lights. The style is Early Geometrical, of the 14th century, as developed in England at that date. The cost of the shell of the fabric is estimated at £50,000.

NEW NATURAL HISTORY MUSEUM.

Our double-page illustration to-day consists of some sketches of the big animals between the dormers of the main façade of the New Natural History Museum. The same beasts are repeated throughout the whole front. The two varieties of gurgoyles are also given. Mr. Alfred Waterhouse, A.R.A., is the architect.

MESSRS. ANDERSON, ANDERSON, AND CO.'S OFFICES, FENCHURCH-AVENUE, E.C.

The building of which we give an illustration has been erected by Messrs. Anderson, Anderson, and Co., shipbrokers, as offices for their business, on land leased from the Fishmongers' Company—the ground floor, with the large entrance-door on the right in drawing, being intended for their own use, the remainder of the building for letting to tenants. Access to this portion is provided by the door on the left, and by a spacious and well-lighted staircase. The aim in the architecture has been, while providing ample window space, at the same time to give an appearance of architectural solidity. The lighting, an important consideration for offices, is successful. Great attention has been paid to the sanitary arrangements, an unusually large supply of lavatory and w.c.'s having been provided. The building is fire-proof throughout. Mr. Andrew Kilby was the contractor.

ADCOTE, SHROPSHIRE.

Adcote, of which we this week give an illustration, is a house of considerable size, now approaching completion, situated about twelve miles from Shrewsbury. It is built of stone from a quarry on the estate. The walls, of considerable thickness, are in all cases lined on inside with brick, the substance or core of the wall being of cement concrete. The house contains an entrance-hall, leading by a few steps up to the large hall, about 60ft. by 32ft., and occupying the centre of the house, indicated in the view by the large bay window and end gable. This room is panelled to a height of 13ft. with oak panelling, the upper part of walls being of ashlar. Across the end of the hall is a very elaborate oak screen, with a gallery over, from which the bedroom corridors on each side of the house are approached, this gallery being reached by a stone stair about 8ft. wide. Ponderous and richly-moulded stone arches springing from corbels span the hall, and carry the open-timber roof. In addition to this hall there is, on the ground floor, a dining-room about 30ft. by 22ft.; drawing-room, 36ft. by 20ft.; library, 22ft. by 22ft.; billiard-room, 25ft. by 18ft., business-room, and the usual offices. The whole of the works are being carried out by Messrs. Hale and Sons, of Salisbury. Mr. R. Norman Shaw, R.A., is the architect.

96, NEW BOND-STREET, W.

There can be little doubt but that New Bond-street will soon become one of the most interesting thoroughfares in the West of London for examples of characteristic and suitably-treated modern fronts. We have already on more than one occasion referred to them, and illustrations will be found in the Building News for Jan. 26, 1877, Sept. 14, 1877, Oct. 19, 1877, of Messrs. Agnew's new galleries, Clifford-chambers, higher up the street, and No. 64, at the corner of Brook-street, "a capital modern example of old Dutch architecture," as Hare calls it in his "Walks in London." This building was by the same architect as that which we illustrate by our double-page to-day. The present example is perhaps the more successful of the two, and looks remarkably well in execution—a result largely due to the alternating courses of red brick and stone. We give several details of the building, as well as a general view from the Royal Academy Exhibition this year. Mr. Robert W. Edis, F.S.A., is the architect.

DINING-ROOM DECORATION.

We reproduce this week another of the architectural drawings from this year's exhibition of the Royal Academy. It was prepared by Mr. Walter Hensman, for Messrs. W. Phillips and Son, of Baker-street, Portman-square. The effect is intended to depend principally upon the woodwork, with coloured flock paper, stamped leather backs to the seats, and low relief plaster ceiling heightened with colour—this last also carried, though in a somewhat less degree, over the lower part of the room.

MESSRS. JAMES EPPS & CO.'S STEAM COCOA MILLS.

We give this week illustrations consisting of view from the N.W., and plans of the two principal floors of the cocoa mills now in course of erection for the well-known firm of Messrs. James Epps and Co. The buildings stand on the extensive site formerly occupied by the Falcon Glass Works in Holland-street, Blackfriars. The mill has a total frontage to Holland-street of about 320ft., the heights from basement floor to parapets varying from 60ft. to 72ft., while the clock tower stands about 110ft. above road level. The total area of the various floors, &c., amount to nearly two acres, The bricks throughout are of Gault clay, except the facings, which are red Suffolk with dressings—cornices, strings, impost bands, &c.—of Bath stone, the attic cornice being supported by terra-cotta cantilevers. The external walls up to the plinth level are in Portland cement, while all internal walls to a level of 3ft. above the basement floor are also in cement. The floors generally of the main building are of wood, while those of lavatories are of concrete and asphalte—all carried on rolled iron girders supported by cast-iron columns. The roofs are of slate with wooden common rafters and iron principals. It will be noted that one-half the clock tower is carried by an iron column extending through five stories, the superstructure resting on two box girders. The sashes throughout, except two residences, are of wrought iron, the glass (except to basement floor) fixed internally to afford a ready means of replacing it in case of accidental breakage. The public entrance to the office and general disposition of that department are shown clearly on the ground plan. The general entrance and exit for all employés is by the covered way from the north. Lavatories, w.c.'s., and urinals are provided on every floor close on the spot where the operatives work—an arrangement involving great economy of time. The more frequent and thoughtless waste of time in the "lavatories" has been considered, and these are so planned as to be kept locked by the foreman until the hour for leaving off. But while the just maximum of labour has been sought for in these provisions, made in the employers' interest, the comfort of the employed has been as justly considered by Messrs. Epps, and dining and tea-rooms are provided, fitted with cooking ranges, water supply, &c. All water, soil, waste, gas service, heating, and other pipes will be concentrated in the pipe chambers, by means of which they are protected, and are readily accessible at any time for repairs or examination. Tramways are provided on every floor for the conveyance of goods from one department to another. The whole of the buildings are being carried out from the designs and under the personal supervision of the architect, Mr. Edwin T. Hall, of 57, Moorgate-street, London, E.C. The contractors for the general works are Messrs. W. Bangs and Co., of Bow-road; for the iron sashes, stable fittings, &c., the St. Pancras Iron Company. Mr. T. M. Deacon was the quantity surveyor. Mr. Ridington is the contractors' general foreman. The builders' contract amounts to about £30,000, while probably the total cost of the premises will exceed £60,000.

THE PREVENTION OF FLOODS IN THE THAMES BASIN.

An important deputation waited upon the Home Secretary and the President of the Council on Monday, to ask the aid of the Government in dealing with an evil, the burden of which has been growing rapidly in recent years. The prevention of floods in the basin of the Thames has been discussed ever since the inundations of 1875. But it appears from the statements made at the Home Office by the deputation which the Marquis of Ripon introduced on Monday, that the same causes of complaint are equally urgent in other parts of England. Representatives were present from Cambridgeshire, Bedfordshire, Yorkshire, Lincolnshire, Huntingdonshire, Somersetshire, Worcestershire, Oxfordshire, Nottinghamshire, Brecknockshire, Durham, Norfolk, Essex, Staffordshire, and Buckinghamshire. The unanimity with which so many different districts declare that some remedy must be applied to a state of things which is becoming intolerable, constitutes in itself a strong case for the legislation demanded. The landowers and other persons interested had, at least, a *primâ facie* claim for the help of the Government in carrying out the arrangements, the cost of which they are themselves prepared to meet. Mr. Cross, in his reply, acknowledged that if the matter is to be taken up at all, it should be dealt with, not by any private member, but by the Government. In this he was supported by the authority of the Speaker, who was one of the members of the deputation. Further, Mr. Cross avowed his conviction—speaking, he said, for himself personally, and not for the Cabinet—that the question "is one better separated from that of County Boards than dealt with in connection with them." As to the particular recommendations of the committee of the House of Lords, Mr. Cross was inclined to regard them as *primâ facie* unobjectionable, though he declined to go so far as to say that they ought to be enforced by law. If the classes represented by the deputation were prepared to bear the cost of measures for the prevention of floods, and unless it can be shown that such measures would be futile and mischievous, the Government, it appears, will be inclined to favour a project of legislation founded upon the report of the Lords' Committee.

THE ELECTRIC LIGHT.

THE practical success of the new method of illuminating streets and buildings renders it advisable that architects should make themselves familiar with the capabilities of the electric light. We may say at once that, so far as our present knowledge extends, there is no probability of the new means of illumination becoming of general utility; but for lighting up large halls, wide and busy spaces in towns, and the extensive establishments of mercers, furniture dealers, and others, the electric light will be more and more extensively used as familiarity compels people to appreciate its advantages. Without entering into a scientific explanation of the principles governing the application of the electric current to illuminating purposes, we can furnish architects and builders with a few facts that may be an assistance to them in their endeavours to understand the subject. The light of the electric arc, then, is pure—that is to say, all the colours of the solar spectrum are visible in that of the arc—consequently the light is white, and shades and tints are as clearly distinguishable as by daylight. But the arc lacks dispersive power: it illuminates in a brilliant manner objects that may be in the path of its rays, and it casts correspondingly deep shadows. To remedy this disadvantage the arc must be inclosed in a shade of some material capable of scattering the light, and obviously ground glass or opaline globes are the most suitable appliances for the purpose. But it is important to remember, in estimating the number of lamps required, that these glass shades absorb about 50 per cent. of the illuminating power, and it will consequently be necessary to make a very liberal allowance for the exaggeration of those who have the apparatus for sale. The amount of light given by the electric arc, or by the incandescence of a piece of carbon or other substance, depends entirely upon the intensity of the current, and though there is no difficulty in dividing the latter, there is a very practical difficulty indeed in dividing the light. If we have an electric lamp, giving an illuminating power of 1,000 candles, it will probably be cheaper than the equivalent of gas, but it must be remembered that it is confined in one shade. When we attempt to divide it, say into 10 lamps, we shall not obtain 10 lights equal to 100 candles each, but 10 lamps whose illuminating power is equivalent to only about 10 candles each. To use the electric light economically, then, it is necessary to employ it as a very brilliant centre, and consequently it is adapted only for large areas, where a flood of soft light can be thrown unimpeded by obstructions pertaining to the building. Efforts are being made to render the light economically divisible—that is, to obtain at a small cost a number of lamps of comparatively small illuminating power; but those best acquainted with the subject look upon these efforts as so many searches after the impossible. The electric arc as a source of light is very much superior to gas or any other illuminating agent; but it has another peculiarity that especially recommends it for use in buildings—theatres, for instance. The arc itself is intensely hot, but has little radiating power, and absorbs a very small quantity of oxygen; consequently it can be used without heating or vitiating the atmosphere. The experiments on the Holborn Viaduct and the Thames Embankment have been so far successful that the practicability of lighting up streets of considerable length has been demonstrated, but it is clear that if the system employed is to have any extended application it must be modified considerably. Like the old gas-lamps too much of the illuminating power is lost in space, and absorbed by the opaline globes, while the system of producing the light is itself exceptionally expensive. As ordinarily arranged four Jablochkoff candles are placed in one holder, and are successively consumed as required. They cost about 7½d. each, and burn nominally for an hour and an half. To maintain the illumination for a night of 12 or 15 hours necessitates a considerable expenditure for attendance, and as there must be a separate motor for each circle of a half-mile radius (it being impossible, except at a heavy expense, to convey the current beyond certain distances), the utilisation of the electric light is more difficult than at first thought might be imagined. The experiments on the Viaduct and the Embankment will be continued for three months, when a detailed account of the cost will be presented to the authorities. Meantime the Werdermann system, which consists of a method of rendering a carbon rod incandescent, will be tried in front of the Royal Exchange, under the direction of Mr. W. Haywood, and it is probable that other systems will be tested when opportunity offers. The Rapieff light has been in use for some weeks in illuminating the machine-room at the *Times* office, and is being fitted in at least one of the composing rooms, where, if found suitable to the nature of the work, it will prove a great boon. A system, almost identical, is being fitted up at the Capitol, Washington, in the House of Representatives, and in several large ironworks, weaving-sheds, and notably Woolwich Arsenal, the Siemens machine with the Serrin regulator, or lamp, is giving much satisfaction. At Messrs. Shoolbred's and Mr. Whiteley's establishments the Jablochkoff system is in use, or is being fitted up, so that in a few months we may expect a pronounced verdict from business men on the suitability of the electric light, with especial reference to its economy, for there is no question as to its superiority so far as the quality of the light is concerned.

THE RESTORATION OF ANCIENT BUILDINGS.

AN adjourned discussion on the subject of the restoration of ancient buildings took place on Monday at a meeting of the Notes and Queries Society, at the Royal Institution, Liverpool. The Rev. S. Fletcher Williams presided. A letter was read from Professor Sidney Colvin, who wrote that he considered it of the utmost importance that the interest of local societies of various kinds should be turned to the subject of architectural restoration. He thought that there was no other consideration that it was possible to set in the scale against the paramount consideration of reverence for the art of the past and jealousy for its preservation, not its false preservation in the state in which "restorers" habitually left it, but its true preservation as nearly as possible in the state in which it had been received from the hands that wrought it and from time together. That such true preservation was in nine cases out of ten consistent with the claims of use he fully believed. In the tenth case, where it might not be so consistent, the particular circumstances must decide whether the principle of preservation or the principle of use must give way. In the ordinary practice of the last 40 years, to fit an old building for use had meant to desecrate its spirit and associations, and to falsify it from floor to pinnacle by unnecessary substitutions, which "restored" nothing but destroyed much. He had no doubt that the public discussion of the subject would help to save the few monuments which remain unspoiled. Mr. Hay read a paper, contributed by Mr. John J. Stevenson, entitled, "Are the Views of the Society for the Preservation of Ancient Monuments Impracticable?" On the motion of Mr. G. A. Audsley, seconded by Mr. William Tirebuck, the following resolution was then unanimously carried:—"That although designed for other uses, many ancient churches, the property of the nation, have in process of transmission become ancient monuments in the spirit of the National Monuments Preservation Act, 1878, and in the opinion of this meeting, such ancient churches selected by the commissioners appointed under its provisions should be embraced in the schedules of that Act." It was decided that a copy of this resolution should be forwarded to Sir John Lubbock, Bart. A paper on the "Historic Uses of Ancient Buildings," by Mr. J. Bromiley, having been read, Mr. P. H. Rathbone moved that, "pending legislation having for its object the protection of ancient buildings, a committee should be appointed for the purpose of gathering information with regard to contemplated restorations, and protecting ancient buildings in this district." Mr. Walter Lewin seconded the resolution, which was carried unanimously. A committee was then appointed, and the meeting concluded with votes of thanks.

THE THEODOLITE.

MR. W. MATTIEU WILLIAMS continued his Cantor lectures at the Society of Arts, on Monday night, on the use of mathematical instruments. Mr. Williams said that in measuring land by the surveyor's chain, they could not depend on the accuracy of it, as there were ups and downs, which made the chain to bend, and thus shortened it. How was that difficulty to be overcome? There was an instrument by which they could discover the distance from one point to another by the rays of light. With this instrument they could stand on the top of one mountain, and ascertain the height of it. They could stand on the Bass Rock, and tell the distance they were from Ben Lomond. The way this was done was, they drew a base-line, and put an instrument at each end of it, but care must be taken that the land was level. When they had ascertained that the base-line was accurate, it was measured by compensation bars, and then looking from the angle at the object at a distance, from the rays of light it could be measured with the utmost correctness. These base-line measurements had been made on Hounslow Heath, Salisbury Plain, and Romney Marsh, and the results were most satisfactory. That instrument was called a theodolite. When he was on Gras Fell some years ago, the engineers were measuring by means of it the distance between one of the high mountains in Ireland and the Island of Arran, catching the spark of light by flashes from a looking-glass, so as to ascertain the base-line measurement. The theodolite was fixed upon a stand wtth a table plate. A few years ago a large theodolite was fixed in the crow's nest, and was above the ball of St. Paul's, and it was considered one of the best points for making an observation for a long distance. The large instrument was used in the great Indian survey. It was so heavy and of such great value that it had to be removed with the greatest care. If he wished to know the distance between the corners of a hall, he would turn the telescope till he found the angle at the one point, then turning it round till he got the other, he looked at the remaining divisions of the scale on the plate, and he at once ascertained the distance between the points. The manufacture of the theodolite required the greatest care, and unless the workman was honest, an inferior instrument would be produced, which would of course become useless. There was a great deal of work about the manufacture of the instrument which was unseen, and therefore the purchaser had to depend on the conscientiousness of the maker. All the castings had to be made of new brass, otherwise it might affect the needle of the compass, which was placed in the centre of the instrument to show that it was level.

NEWHAVEN HARBOUR.

THE Newhaven Harbour has for many years occupied the attention of those interested in the Franco-English traffic, and the London and Brighton Railway Company have assisted the harbour trustees in their improvement works which have been carried out there during the past twenty years. They have naturally taken a deep interest in all that has been proposed or done for the improvement of the harbour, and negotiations have from time to time been carried on between them and the trustees, with the object of devising some scheme for the purpose, and recently an agreement was entered into, by the terms of which the railway company, for a stipulated annual payment, take into their own hands the duty of dredging the harbour and bar. For this purpose they have obtained a powerful steam dredger, built by Messrs. Symons and Co., of Renfrew, which is now actively at work. The question of protection to the entrance of the harbour, so as to allow vessels to enter in all states of the weather, and increased accommodation inside still remains, and a plan has been devised by Mr. F. D. Bannister, M.I.C.E., the engineer to the railway company, to effect these objects, and this plan in its general features, with the exception of the dock, is almost identical with the recommendations of Mr. Rennie in 1810, and of the Royal Commission in 1844, before alluded to. The plan, according to the *Engineer*, comprises (1), a breakwater about

1,000 yards in length, to be run out seaward from the shore at Barrow Head, westward of the harbour, in a direction to protect the entrance of the harbour from the prevalent south-western and southern gales. (2) The extension of the two entrance-piers, and widening the entrance from 150ft. to 200ft. (3) The construction of a new wharf or quay between the Mill Creek and the eastern entrance-pier, affording additional quay space—about 600 yards in length. It is intended to widen the harbour opposite this new quay, and deepen it to 12ft. at low water spring tides. (4) The construction of a dock with entrance lock and gates on the marsh land between the harbour and Catt's Tide Mill, with a water area of twenty-four acres, and quays of about a mile in length. (5) The construction of durable sea walls to protect the foreshore and works, extending from the breakwater on the west to Catt's Mill to the east. (6) Dredging the whole of the existing harbour to a uniform depth of 6ft. at low-water spring tides, and the entrance and new portion of the harbour to a depth of 12ft.; and also to dredge the space outside protected by the breakwater to a depth varying from 12ft. to 18ft. at low-water spring tides. In connection with these improvements it is intended to provide all necessary wharves, landing stages, tramways, cranes, sheds, and all appliances for carrying on a large trade. Up to a recent period the difficulty and expense of constructing a solid work capable of resisting heavy seas, so as to form a durable breakwater, has been very great, and, except in the case of such large national undertakings as Plymouth, Portland, Holyhead, Dover, &c., has been the main cause of preventing many harbour improvements, and the constructions of works of refuge so necessary on our coasts. Although many methods of construction, and some of great ingenuity, were submitted to the various committees and commissions, the general mode of construction hitherto adopted in large breakwaters has been the system known as *pierre perdue*; the base or foundation being formed by loose stones or rock thrown into the sea and heaped up from the bottom to near low-water mark. The bank so formed being allowed to settle down to a natural slope and consolidate, the upper surface is then prepared by divers to receive a superstructure of solid masonry. This is the mode adopted in the construction of the great breakwaters of Portland, Plymouth, Holyhead, and others, and is necessarily a very costly process, owing to the large quantity of material required to form the base, the necessity of employing divers to place the blocks of stone in position under water to form the superstructure, and the large size of the blocks of stone required to resist the action of the sea. In more recent times concrete has been largely used in the construction of sea works, and in the form of blocks this material enters largely into the construction of the breakwaters at Dover, Kurrachee, Kustendji, Cherbourg, Madras, and other places, and compares favourably as to cost with the old *pierre perdue* system; but the difficulty was still experienced of placing the blocks in position, and of making them sufficiently heavy and compact to resist heavy seas. It is proposed to construct the breakwater at Newbaven entirely of concrete, and to adopt the system successfully carried out at Aberdeen, where a breakwater or pier has been built in 18ft. of water at low tides without the aid of divers, Titans, or heavy machinery for placing the blocks, &c., and has stood the heavy storms and seas of the north-east coast for eight years without injury.

ST. ALBAN'S CATHEDRAL.

THE St. Alban's Restoration Committee, after hearing a paper by Mr. J. O. Scott on Mr. Street's report to the Society of Antiquaries and their resolution thereon, have resolved, with only two dissentients, to adhere to the former resolutions of themselves and of the meeting of subscribers last August, to replace the present ruinous low roof, to which Mr. Street assigned even a later date than had been previously claimed for it, and the ceiling which he admitted to be worthless and decayed, by a new roof on the visible Early English lines, for which a considerable length of parapet has been rebuilt already. The committee were convinced that Mr. Street was wrong in saying there had been no parapet in Early English and Decorated and Perpendicular times, and had overlooked several indications of the levels both of walls and roof having been altered when the Norman roof with eaves was replaced by the early English one with parapets, which were almost universal in great church roofs of all periods after the Norman.

We hear that, in consequence of the building committee having refused to sanction a proposal to authorise the architects of St. Alban's Cathedral—Messrs. G. G. & J. O. Scott—to confer with the Institute of British Architects on the subject of the proposed high-pitched roof, the Venerable Archdeacon Grant and Mr. John Evans, F.R.S., F.S.A., have announced their intention of resigning their places on that committee, deeming it inconsistent to remain members of a body which obstinately adheres to a course which the highest authorities have declared to be impolitic, mischievous, and unnecessary.

The following letter from Mr. G. E. Street, R.A., appears in the *Times* of Wednesday:—

"The Cathedral of St. Albans is a fabric in which all England has a right to be interested. Its temporary guardians hold a faculty, issued in 1877, enabling them to 'repair' and 'restore' the church; and no one would be more pleased than I should be if they would simply exercise these two useful powers. They have, however, for some months been contemplating a very different work, indeed—viz., the removal of an ancient oak roof from the nave, and the erection of a new fir roof in its stead. Their architect had reported in June last that the old roof could perfectly well be repaired, and, which was even more important, he had told them what Sir Gilbert Scott intended. 'My father's object,' he wrote, 'was twofold: to preserve the old roof as an interesting portion of the abbey, and to render it sound and serviceable.' And he went on to describe the repairs by which 'no doubt a sound roof would be obtained.' Within about two months of this formal statement the world was concerned to hear that, after all, the roof was condemned as ruinous, and that an entirely new one was to be erected in its place if funds could be obtained. Three weeks ago I was able to examine this roof, and found to my delight that the new roof had not been begun, and to my surprise that the old roof, so far from being rotten or ruinous, could without difficulty, and at moderate expense, be put into a very good state of repair. In this confirmation of Mr. Scott's views I was joined by Mr. Blomfield and Mr. Christian, who examined the roof with me, and by Mr. Neale and Mr. White, who did so independently. My paper, read before the Society of Antiquaries on the 28th of November, followed, and it is to this that the resolution of the St. Alban's Committee, printed in the *Times* of Saturday, refers. This resolution was carried, it seems, by five to two. It deals with some large architectural questions which may be open to discussion. But I venture to assert that though the question of what the pitch and height of the original roof may have been is one of much difficulty and no little interest to archæologists, it is not the question before us. Mr. Scott holds that the highest mark of a roof which he can detect against the tower, though it cuts across windows and string-courses in a strange and unusual way, is that of the original Norman roof, though the Norman walls were about 3ft. 6in. lower than the existing walls. I, on the contrary, hold that originally all the walls and roofs finished at the same level, and that what this was may be ascertained with absolute certainty by the existing remains *in situ* of the outer gables of the transepts. And I hold that in such a case, when the central tower is beyond all dispute by far the finest architectural feature in the church, the new roofs (if they are required) should rise no higher against the tower walls than its architect intended, and should, if possible, follow the original design, which can still be ascertained with a near approach to accuracy. But where doctors differ, as they do here, there is happily a remedy which may well be recommended—viz., Lord Melbourne's famous advice 'to leave it alone.' Every one is now agreed, I suppose, that the flat roof of the nave is of mediæval construction, that it always had parapets, and that it can be repaired so as to last as long as any fir roof which may be erected in its place. On the other hand, if a steep roof is to be erected, it is open to discussion at which of the three levels and slopes it is to be constructed, the only certain thing being that at neither of the three could the work be a restoration in the true sense of the word. Where such differences of opinion exist, surely the wise course for the committee would be to fall back upon the power granted in the faculty to 'repair' what still exists. It was stated at the meeting on Thursday that a sum of £400 would be sufficient to repair the old roof so as to admit of its remaining with safety under the new roof, which it seems is the latest proposal. We shall hear in time by what ingenious process the two roofs are to be contrived so as to make the new one safe and strong without any removal or destruction of the timbers of the old roof. But even if this were possible, what a strange scheme it is, and how little can it commend itself to those who try to harmonise their antiquarian enthusiasm with a little common sense! I should not be true to the art which I love so well if I did not raise my voice against a work which it is now allowed on all hands is, not as was so strongly affirmed in August last, a work of necessity, but solely one of taste, as to which each of us will have his own opinion to the end of the chapter, and for indulgence in which our new buildings seem to me to give ample scope. I ought to add that the cost of the new fir roof (exclusive of the western gable) appears to be reckoned at about twice the cost of the complete repair of the old roof with its lead covering. And though I cannot but admire the spirit of a committee which does not allow a question of expense to stand in the way of doing such a work in the best manner, I cannot but hope that subscribers to the work may be led to think that where so much money is urgently wanted for other works, it might be well to economise their expenditure on the nave roof if, after full discussion, it appears that educated opinion is on the side of economy."

FROST AND WATER PIPES.

FROST is certainly not the friend of the builder, however much he may be of the plumber, while those who have let their work to contract have to suffer considerable delay in consequence of the remission of time granted to the contractor in consequence. Large buildings all over the country have been standing still during the last few days as regards the bricklayers' and plasterers' work, and the delay in some cases becomes a serious loss, either to the employer or contractor. To avoid the evil of a suspension of work some contractors hasten on their walls with an undesirable impetuosity, and we have observed a few instances in the suburbs of London where the walls of houses have not been improved by the process. Of course when once a building is fairly covered in the work of the interior can proceed at the usual rate of progress, having regard to closing up all openings, and the occasional lighting of a fire. The plumber manages to reap a rich harvest from the freaks of Jack Frost. We have during the last few days heard repeated complaints of the stoppage and bursting of water-pipes, and the cutting off of supplies to cisterns and boilers, notwithstanding years of previous failures, warnings, and suggestions. It is quite beside the question to allege that the fault is due to bad workmanship, or to argue that this is exceptionally severe weather, the simple fact that a large number of houses are exempt from the inconvenience of having no water being a sufficient proof that the remedy is within the application of the builder or plumber. In fact, we must lay the damage caused by frozen water-pipes to the charge of the employer, builder, and plumber, if not to that of the architect. The remedy is so simple, and within every one's reach, that it is from pure neglect such a thing as a frozen pipe can occur. The chief causes are the exposure of the supply and service pipes, and the ill-protected position of the cistern. We frequently find main pipes brought through a cold vault or area without the slightest protection or covering, or it is made to run up the outer angle of a

building exposed to cold winds. From the first error we have seen numerous instances of burst water-pipes in coal vaults and areas, which might readily have been obviated by the simplest wooden casing, or even a wrapping of straw. Why plumbers still persist in embedding pipes in the corners of walls instead of forming a casing for them can only be explained by assuming the existence of a desire not to make too lasting a job. They may rejoin, however, with some fairness, that their prices are cut down too much to admit of good work. Thus, the defect is at once shifted from the plumber to the builder, or the pocket of the employer. Several remedies have been proposed at various times in our own pages for preventing this inconvenience, such as packings of saw-dust, wool, felt, straw, but we believe the mischief is easier to prevent than to cure. The simplest remedy is to keep the draw-off taps a little space open to produce a current. Great lengths of exposed pipes, iron and slate cisterns under roofs without proper casings, are conditions which cannot fail to produce the freezing of water and the stoppage at the ball and other valves. When water cannot be drawn many persons are apt to get a supply from the cistern. Care is necessary not to tamper with the ball-cock when it is frozen up, which it is generally very apt to become, and the only safeguard required is to free the waste pipe in case of an overflow. The best plan, however, under all circumstances, is to shut off the supply from the main during a frost, for when a thaw commences, the pipes not unfrequently burst, particularly when the pressure of water is on. Another source of inconvenience and danger, attended sometimes with loss of life, is that of boilers to kitchen ranges, which burst on account of the supply pipes becoming stopped by frost. We have known several instances of fatal accidents caused by the simple neglect of providing a safety-valve to all boilers for domestic use.

GEOMETRIC METHODS APPLICABLE TO WORKS OF BUILDING AND OTHER CONSTRUCTIONS.*

IN a recently-published treatise, called the "Artisan," the author, Mr. Robert Riddell, late teacher of the artisan class in the Philadelphia High School, and the publisher of some valuable works on carpentry, joinery, and handrailing, has attempted to divest the ordinary methods of practical geometry of all difficulty. In the work now before us the traditional rules of geometrical construction have been set aside or simplified, and a series of geometric drawings and descriptions are given in which the value of lines in producing practical results of much use to the practical artist is indicated. Between scholastic or instrumental geometry and rule-of-thumb methods there is a large field open, and Mr. Riddell appears to us to have taken advantage of it by showing in how many different ways constructions may be facilitated. If, in teaching the artisan, it could be proved to him that he may arrive at results precisely the same as those obtained by the rules of ordinary geometry, with the aid only of his tools and the exercise of his eye and mind, it is evident a decided victory has been gained over the dislike of the artisan to conventional rules, and over that inertia of disposition and those obstacles to self-instruction which at present impede his progress. If, with the aid of only a pencil and compasses or square, the young artisan can be taught to construct squares and polygons and solids, set out his hip-roofs, or represent objects in isometric projection, he will quickly learn to make himself a master of the method, and his productions will be influenced by the skill so acquired. His work will be performed with greater precision and economy, and in effect he will begin to feel intelligently interested in his work in proportion to the combination of brain with hand.

One of the most valuable applications in the work before us will be found to be the many uses to which the right angle may be put. Thus the utility of the framing square is exhibited in various ways. In dividing a given angle the compass method of describing an arc and then drawing from its extremities two others crossing each other, may be performed in a simpler manner by the joiner's framing square, well known to all skilful joiners—viz., by marking two points equidistant from the given angle, and applying the square to the points equidistantly. In bisecting acute and all angles of roofs, the same method can be employed. In setting out templets or angles of 30° and 60°, and in finding the diameter of a circle, the use of the framing square is equally well known, but it is limited as a rule to these simpler constructions. There are few acquainted probably with the simple method of dividing lines into equal parts, and in constructing equal squares without compasses, by the use of the angle of 45°. But when once seen the methods are so obvious they cannot be easily forgotten. Plate 3 show several applications of this sort. The mode of finding the sides of an octagon from a given side by the angle 45° is comprehended directly by a diagram, and any one with the help of that angle could solve the problem without much trouble. One of the most valuable problems that can be solved with the aid of a right angle, quadrant and equilateral triangle is the division of the circumference of a circle into any number of parts. It is known that the radius of a circle divides the circumference into 6 parts, and from this the idea of a scale of equal parts upon a tangent to the given circle is suggested, by which, with radical lines drawn therefrom, cutting a perpendicular or radius, the several chords are obtained, which will divide the circumference into the number of parts required. Plate 10 shows a further utility of the framing square for dividing a line of any length into equal parts, and giving the length of each. The method of doing this is simple. Let the tongue of square or the perpendicular equal the given line and make the horizontal or blade of square measure by scale the number of parts required. Draw the hypothenuse, and set off on blade from the last point one part, then a line "squared over" or a vertical line drawn therefrom, cutting the hypothenuse will equal in length the required unit that will divide the line into the necessary number of parts. In dividing a space of any great extent a ½in. scale is most convenient. This method is based on the principle of similar triangles. The application of the same simple principle can be made to give the surface measurement of boards by dividing each of its sides into any number of equal parts, making one side represent length and the other side the width of board. The number of square yards in a floor or carpet can be determined by the same method. Mr. Riddell's treatise enters into many useful problems of practical joinery. A very common and perplexing question described is the finding of the curved edges in circular work on the splay, as in those of a circular soffit to a door or window. Instead of veneering the author observes:—"A simple and economic mode is to work the soffit in the solid by making the interior and exterior ribs form the stiles, and sinking the centre rib to form the panels. The ribs being glued and screwed together nearly complete the soffit. Skilfully handled this latter method presents a job equal in quality and appearance to veneering." Methods of finding the bevel cuts for splayed work, so necessary in joiner's and mason's work, are clearly explained; also the modes of finding butt-joints, the construction of hip-roofs of different angles, and angle ribs and niches. Handrailing is cleared of much mystery, and simple methods of forming the "wreaths" given. The author justly shows the value of cardboard models in exhibiting the relations of lines to each other. In bevelled and splayed work the use of modelling as a safeguard to the learner cannot be too strictly enforced. Another useful part of the work is confined to an elucidation of the principles of isometric projection, and the author strongly recommends the art from its "great simplicity and application to the workman's attention as a superior aid in directing his execution." The plates given show representations of various simple objects, and they are, in fact, self-explanatory. Throughout, the work comprises 40 plates, drawn to a large scale in a clear and intelligible manner, and the artisan will find Mr. Riddell's treatise a reliable guide, while the student in search of an expeditious road to geometrical knowledge will esteem it a most valuable companion, as proving with what simple instruments he may become a master of his art. Mr. Riddell may be regarded as a modern Peter Nicholson.

* The Artisan: Showing the most Practical Methods that may be Applied to Works of Building, &c. Illustrated by 40 geometric drawings. By ROBERT RIDDELL, &c., Philadelphia.

THE AMERICAN INSTITUTE OF ARCHITECTS.

THE twelfth annual convention of the American Institute of Architects was held last month in new York.

According to the report given by the *American Architect and Building News*, the most important question of practical bearing discussed was that of the responsibility of architects for the failure of buildings put up under their direction. This was introduced by a draught of a general law proposed by the Rhode Island Chapter, which provided that the architect or superintendent of a building should be held responsible, under severe penalties, for loss or injury due to the failure of his work, unless it proved that it was not carried out according to his intention, in which case the responsibility should pass to the builder. Mr. Clark's paper on the "Liability of Architects" also turned discussion in the same direction, citing the practice of the French courts, which holds the architect and builder to a joint liability—apportioned according to the evidence of fault in each case—as distinguished from the English and American habit, which allows the client or injured person to attack whichever he chooses—a privilege that is apt to lead to the discomfort of the architect and the escape of the builder. The discussion showed considerable variety of opinion, there being, however, a pretty general agreement as to the importance of holding architects to a strict accountability for the quality of their own work, with symptoms even of a generous readiness to accept liability for the faults of other persons as well as their own. One speaker argued against the restraints of specific building laws, which, being made to suit a particular class of cases, as he had found by his practice in New York, were an actual hindrance to satisfactory construction in others; so that a building might, he thought, be built in exact accordance with the law, which would infallibly fall down. He therefore favoured the enforcement of individual responsibility rather than of restrictive laws. It was time, another urged, that the law stepped in to teach persons who dared to add "architect" to their name the weight of the responsibility they assumed; and he thought the penalties to which architects were liable could not be too great, so that incapable pretenders might, if possible, be prevented from assuming their duties. A third held that the public was ready to take care of itself, and that there was no reason why architects should interpose to provide protection for it by urging legislation. If it were desired to eliminate incapable men from the profession, it was better to begin at the other end by establishing some standard of qualification, and not allowing unqualified persons to practise as architects.

The general course of the debate showed that while the liability of architects was sufficiently well recognised by them and by the public, and unhesitatingly enforced on occasion, the profession itself had no very definite idea of the limits of liability or the best way of enforcing it. The discussion, in fact, drifted away from what was the chief point brought forward in the Providence resolution, and suggested by Mr. Clark's paper—the point which we think most needs the attention of architects—the discrimination between their liability and that of the builders who work under them. At present the American practice seems to hold both of these persons liable, and as against the public the owner also, and to visit the wrong, where an injury occurs, upon whoever happens to be nearest or most visible or most solvent. Among these three the builder, being usually the least conspicuous, is most apt to get off free. When the architect is to be held as first hostage, as some of the speakers at the convention seemed to wish him to be, the kind of superintendence which this position requires from him ought, it seems to us, to be clearly

distinguished from that which is tacitly understood, given, and accepted in the conduct of ordinary work, and the fee for it ought to be considerably greater than is allowed in the regular schedule of charges. As for the building laws, it must be remembered that though skilful constructors would be more comfortable without them, and may even be impeded by them in their development of actual improvements, it is not they who are aimed at by them; and it is more for the general good, since, as one speaker remarked, the laws cannot be made elastic, that a capable architect should now and then be hampered by them than that Cheap Jack, who has no fear of responsibility, and who does five times as much building, should be allowed to do it at his will. After a pretty animated debate, the convention let the subject fall without action.

The most important resolutions adopted by the convention were the following, touching the conduct of members in competitions :—

"That any member of this body who, in case of competition, should propose or agree to undertake the work for which he is competing for a less commission or compensation than his fellows in the competition violates the sole condition of membership in this society—viz., 'the honourable practice of his profession;' and that upon proof of the fact to an investigating committee, which shall consist of three Fellows, who shall be appointed by the Board of Trustees upon the demand of two Fellows, of the Institute, he shall be declared to be expelled by the Board of Trustees, without further action of the Institute as a body, and that such expulsion shall expel him also from the chapter."

"That if in case of paid competition any member of this Institute shall offer his services free of charge he shall be liable to censure, if charges are made by two Fellows and a committee appointed as provided in a former resolution, for censure for violation of the conditions of membership in the Institute."

Another question of practice, which was referred to the Board of Trustees, was suggested by the letter of a member of the Boston Chapter, who complained of the provision in the published schedule of charges, that the whole fee or commission on "stores" shall be 3 per cent. This certainly is a hardship to the architect, unless "stores" is defined to mean plain warehouses or something like them; for, as the writer urged, the greater part of buildings which are nowadays put up in our cities under that name require from the architect as much care and design, in proportion to their cost, as dwelling-houses, churches, or public buildings.

The paper on more technical subjects, which led to most discussion, was that by Mr. Littel on the "Use and Abuse of Brick in Decoration," in which the writer discountenanced this use of brick, and favoured the employment of stone for the ornamental parts of buildings, on account of its superior breadth and solidity. The debate turned chiefly on the advantages of terra cotta and moulded brick as building materials, and of carving in brickwork. One member objected to moulded bricks on the ground that their lines were always coarse and unsatisfactory, and that being moulded on the ends they gave only members of 4in. wide, and so tended to monotony of scale—all of which may be true as concerns the inferiority of brick to stone for the finer uses of building, and yet leave a wide range of work in which it can be employed to good purpose. In favour of carved brick the point was made that it had an advantage over terra cotta inasmuch as it could be carved in its place—a process which its advocate said he always employed in stone carving, that he might see the effect of his work as it went on. To this the advocates of terra cotta replied that the clay could be carved or modelled in its place, and burnt afterwards, and added, fairly enough, that it was a more reasonable proceeding to carve the clay before burning, when it was soft and tractable, than afterwards, when it had become hard and intractable. The arguments were furnished by a small number of those who were present, and there was nothing to show what the prevailing opinions were.

THE ROUS MEMORIAL, NEWMARKET.

We have examined the design selected by the committee for these buildings. The committee were assisted in their decision by Captain Galton, and the Prince of Wales, we understand, interested himself in the matter. The design chosen is by Mr. F. W. Roper, of 9, Adam-street, Adelphi, and consists of two blocks of almshouses of 5 cottages each, and a cottage hospital to accommodate 10 patients. The author has placed the three blocks so as to form a quadrangle, in the centre of which is shown a statue of Admiral Rous. The almshouses of one story appear to be economically and simply arranged. Each house has an entrance between a living room and a bedroom; the former is about 12ft. by 10ft., and has a bay window. A pantry faces the entrance. From the living room a door communicates directly with a small scullery with coal closet. A small yard, with an earth closet, &c., is obtained in the rear, closed off by a wall from a garden. An alternative plan shows 3 of these cottages for single men, and an end cottage for a married couple on each side of quadrangle, which, in this arrangement, faces Rutland-street instead of Upper Station-road. The hospital is shown separated a little distance from the ends of the almshouse blocks, with a distinct entrance road from Rutland-street; this is desirable. In plan, Mr. Roper has disconnected his wards from the central administrative block, which latter is of two stories in front, and forms a pleasing centre to the quadrangle group. A ward for 4 beds, 22ft. by 17ft., with lobby and projecting lavatory, sink, and water-closet, on the pavilion principle, besides a single-bedded ward, 12ft. by 10ft., are connected by a corridor with the central block on each side forming single story wings. One good feature we notice is the front verandah, with seat for the use of convalescents. The front of main building is devoted to a committee-room and a matron's room. Behind the connecting corridor, on the left side of a central passage, there is a bath-room in convenient proximity to the entrance, and a lobby leading to the operating room, which is lighted above. The dispensary adjoins, with separate entrance. On the right side is a nurses' room and stairs to 4 bedrooms, and the kitchen and the store-rooms, &c., are placed behind. We should have liked to have seen more cross ventilation in the wards; but, on the whole, the plan is well considered. The author has adopted a common-sense brick treatment, with high-pitched roof, having a touch of Queen Anne in it. The walls are to be faced in red brick, the roofs tiled, and the gables relieved by ornamental plastering.

BLACKBALLING AT THE ARCHITECTURAL ASSOCIATION.

Having made a mistake, the most graceful thing to do is to acknowledge it and make amends. The Architectural Association undoubtedly made a very strange use of the ballot when nineteen candidates were ejected out of sixty nominations, but there can surely be little reason why that society should solicit on bended knees each of the nineteen to allow their names to be put up for re-election. This was proposed by some members at a special general meeting of the Architectural Association, held last Friday, to consider the subject. We have no space for a general report of the proceedings. During the debate Mr. Mathews and Mr. Blashill spoke very strongly against the action of Mr. Scott in demanding a ballot, as they considered an injury had been done to the Architectural Association itself as well as to the gentlemen who were blackballed. The opinion of two such practical and experienced members of the profession is certainly worthy of consideration, but in their desire for "the restitution of all things," these speakers overlooked the fact that their proposal of renominating without the consent of the committee would lead to all manner of abuse. Mr. Ridge and others argued against the proposal of Messrs. Mathews and Blashill, and the whole question of elections generally was, on the proposal of Mr. Scott, unanimously referred back to the general committee. It is certainly to be hoped that all those who are really eligible out of the rejected nineteen will be elected, and that in determining the manner in which elections in future are to be conducted, the greatest care will be exercised, seeing how important a society the Architectural Association has become, chiefly, of course, as regards the education of students for the profession, the ranks of which have increased during the last few years in an enormous degree. The duty of the members of all professions is to make sure, as far as possible, that all who enter their ranks shall come in by the door of apprenticeship, and thus prevent intrusion. Every one who has been present when several members were elected at the Architectural Association must have observed how very inadequate the voting by show of hands has been, most names being passed without more than three or four hands being held up, and many without any show of hands at all, while the names of all are read over in a hasty and sometimes inarticulate manner. By this means, no doubt, several men not strictly architectural students have been elected to full membership, and they in turn have introduced friends from their own class in a few years to appear as fully fledged architects. We cannot but agree with the proposal to introduce the ballot, and as we have already said, the manner in which it is used at the R.I.B.A. might be well followed by the A.A.

NOTES FROM EDINBURGH.

The prospects of the building trades are not at present pleasant to contemplate, and everywhere throughout the country there is more or less lack of employment, which in some quarters is causing destitution. So far as Edinburgh is concerned, the same symptoms are making their appearance, but not in this aggravated form—at least as yet. The year about to close opened hopefully enough as compared with the position of the building trade in other parts. There was much work in hand and more in contemplation—projected schemes for building on the vacant feus of Warrender's Park, Merchiston, and other districts in the suburbs. The collapse of speculation in such large towns as Glasgow and Dundee, by increasing the number of unemployed hands, had the effect of lowering the price of labour in the beginning of the year. Since that time wages have fallen, and masons and carpenters are now content with 7d. per hour. Plasterers and plumbers struck work during the year, and remained out above two months, but resumed work at the masters' terms. The stimulating effect of the fall may have retarded the result, but there is no longer any doubt but that speculative building has received a check for the present. The autumn has brought such a frightful list of disastrous failures to light, and so much desperate bankruptcy in trade may be to come, that it would be folly to expect building operations for the coming year to continue on the same scale as formerly has been the rule. Unmistakeable symptoms have indicated during the year that the demand for house accommodation is not what it was. A good many villas and suburban houses of from £50 to £60 rental have remained unoccupied. It cannot be said that the palatial residences of Drunshaugh are letting easily, and it is very improbable that any great demand can exist for houses of the cheapest kind. Speculation may well rest awhile till the return of better times.

The rate at which the city has been extending its borders is nothing less than marvellous. The following large amounts represent, in round numbers, the increase of rental resulting from the operations of the last three years—£50,000, £70,000, and £80,000—and it may be added that within the last 20 years the valuation returns have been doubled.

But though speculative building may decline, there are some large undertakings on hand, and in prospect, which will make depression more endurable. The University extension buildings are just beginning, and a new hospital for incurables. The work of the Improvement Trust is not yet complete, and the School Board have resolved on building four new schools. Church-building may take encouragement from cheap labour, and the new Police Bill may create demand for labour of a miscellaneous description.

This measure has been hatching for some years. The vast extension of the City suburbs has rendered further legislation necessary, and the bill introduced this session into Parliament will consolidate and amend the previous Acts, and provide new legislation as circumstances shall require. There are many provisions bear-

ing on the construction, ventilation, and healthy arrangement of houses, public and private, and the best and latest experiences will be brought to bear on the details of the measure before the sanction of Parliament is given. A few of the provisions of the bill are these. The whole of the foot-pavements, as well as the roads and streets contained within the boundaries created by the Act, are to be vested in the Corporation, and placed under their management and control. Extensive powers are taken to secure the erection and maintenance of "healthy dwellings" and lodging-rooms. A minimum of cubic space is fixed for small apartments, constituting a house. The introduction of water and waste is made imperative, and their proper ventilation and management are to be placed under the control and inspection of the authorities where that is found to be advisable. The Dean of Guild Court has its constitution amended by the introduction of citizens not members of Council, who may be specially qualified and willing to serve the public in this court. The drainage of the city, exclusive of the Water of Leith district, is to be under one system and assessment, and all drains which may be private property are placed under surveillance and control of this department.

The work under the Improvement Trust has made not only real but much visible progress during the past year. The opening from Nicholson-square into Bristow-street has been finished under the name of Marshall-street, and the aspect of this short thoroughfare is not unpicturesque. The street has one of the Board schools on one side, and the imposing front of a Baptist church in modern Byzantine style, on the other, and the new part of the tenements is in the Scotch style, plainly but tastefully designed. Chambers-street has now but one gap remaining, and Jeffrey-street gives indications of being less of an eyesore from the North-bridge, by removal of the ruins, which were anything but picturesque. The new Cannon-gate school beside this thoroughfare is now finished, and has a good effect. The style is ordinary Domestic, with crowstepped gables, well-arranged and well-proportioned lights. As far as external aspect is concerned it will bear favourable comparison with some of the others, which are more or less affected by the mania for Gothic dressings and details.

Two large hydropathic institutions, begun last year, are now nearly complete. With this additional attraction, the best of medical advice, and the most healthy situation in the kingdom, the advantage of Edinburgh as a residence would seem to be unrivalled. There is a marked contrast between the two institutions so far as regards the architecture of the buildings and the situations selected. Both are within easy walking distance of the city, and command extensive prospects to the North and East. One has nestled itself happily at the base of a picturesque range of hills at Slateford, and is surrounded by an extensive environment of fine old forest trees. The style is Classic, and the design, which embraces a central façade and the usual wings, has been carefully studied, and very happily arranged for the harmonic proportion of its principal parts and all subordinate details. The effect of the Classical contour against the rugged outline of the hills and amid the forest landscape at the base, is very pleasant. The rival institution has not been so happy in its site, and has nothing to recommend it in the way of architectural effect. It stands on a bare ridge, in the immediate neighbourhood of a cemetery and asylums for the destitute and the insane—fully exposed to northerly and easterly gales. Its plan is angular, and its design is that of the corner portion of an over-lofty street which has trotted out to the high ground, where it will doubtless long maintain the unenviable notoriety of being the ugliest building for its size within sight of Edinburgh. There is no balance of parts, nothing to suggest the country mansion, nothing about it but a rather ugly reminiscence of the street. An attempt to give it something of a rustic aspect by planting woodwork about the upper portion at the corner, and roofing it with pantiles, only makes matters worse. The builder, for no architect has been consulted, is not so much to blame as the directors, who will probably discover, when too late, that the claims of architecture form a powerful element of success, and ought not to be ignored where people come to be amused and made generally happier and better than at home.

The spire of St. Mary's Cathedral is nearly completed to the first stage of the spire above the lantern portion of the tower, and the four statues of this portion are in position. The beds are horizontal. The mason work of the library and small corridor passage at the east extremity are also finished; this library is placed against the north aisle of the choir. The contractor completed his work upon the nave some time ago, and the font has been erected. This portion of the church is completely shut off by screen of canvas-work from the transepts and choir. The choir organ has been fitted up, and choir practice begun. The nave would probably have been opened for service by this time, but the Walker legacy, like others, cannot be implemented without help of a lawsuit. The clerical and trust authorities are not agreed upon two knotty points—1st, as to the power of letting seats, for which, it is said, 1,000 applications have been made; 2nd, the power to open the church before it is complete. The Court of Session will be petitioned for direction, and most people will think it no great misfortune if the lawsuit lasts till the completion of the edifice, which, according to the contract, must be within the ensuing year. The nave itself is so nicely proportioned that it might be a good model for a Presbyterian church, but any detailed description would be out of time and place. The west doorway is now free from all obstruction, and, for its size, is probably equal in design and sculptural detail to anything executed in the old Norman or Early Gothic times. The sculpture on the tympanum is very elaborate and delicate, but expressive in its details. Some notice of their sculpture has already appeared in the BUILDING NEWS, but readers may like to know that a large full-front photograph of this work of art has been published, in which the detail is admirably rendered.

MARINE TIMBER CONSTRUCTIONS AND THE MEANS OF PRESERVING WOOD FROM THE TEREDO NAVALIS.

A VERY interesting series of experiments was undertaken some time ago by the Royal Academy of Sciences at Amsterdam to inquire into the best means for preserving wood from destruction by the ravages of the *teredo navalis*. A commission was appointed, consisting of Messrs. W. Srolik Harting, D. J. Storm Buysing, J. W. L. Van Oordt, and E. H. Van Baumhauer to collect and examine facts, and we have before us a report by the last-named gentleman upon the conclusions arrived at. The examination made by Mr. Harting on the structure and habits of the *teredo* is peculiarly instructive. It is ascertained that the mechanism of the mollusc is of a two-fold kind. Those found in calcareous rocks make their excavations chemically by the agency of a dissolving acid secretion; but the *teredo* that perforates wood employs mechanical means only. Into the peculiar structure and organic arrangement of the *teredo* we do not intend to enter here, though the engravings and particulars given by Dr. E. H. Van Baumhauer furnish a very detailed and clear account of the structure of the mollusc and its bivalvular shell and teeth. The *teredo* appears to have existed in a geological period earlier than our own, the discovery of fossil wood perforated by the *teredo* in the Eocene formations lending confirmation to this view. It has also been found that certain circumstances favour the increase and ravages of the animal: these are a moderate rainfall, an increase of the saltness of the water, and an increase of temperature. The experiments of the commission included processes that had been recommended to the Government to protect the marine works, and the pieces of wood to be experimented with were allowed to be prepared by the inventors themselves to prevent any charge of unfairness. The ports of Flessingue, Harlingen, Stavoren, and Nieuwendam were selected first for the trials, the woods employed being oak, red fir, ordinary fir, and Pinus sylvestris in pieces about one metre long, by two and three decimetres square. By the side of these blocks other blocks of the same kind of wood were placed without any preparation, as counter-proofs. The trials consisted of (1) coatings applied to the surface of wood; (2), impregnation with different substances which modify the interior and surface of wood; (3), employment of exotic woods. Under the first head the methods of coating, examined by the commission, are metallic paints, such as M. Claasen's; mixture of Russian talc, coal tar, resin, sulphur, and finely-powdered glass applied hot on a roughened surface, paraffin varnish, coal-tar applied cold in successive layers, or hot on carbonised surfaces, &c.; painting with colours, mixed with turpentine and linseed oil, singeing or carbonisation of the surface. All these exterior applications failed, and the commission are convinced that no guarantee of their continued efficacy can be given. The practice of warding off the teredo with a coat of mail made of nails, is considered costly, and an examination of some piles proved that the coating of iron and rust was not proof against the ravages of the teredo in the interior. Sheets of iron, copper, or zinc are pronounced effectual only so long as the surfaces remain intact and undamaged. Nature affords often a better protection in covering marine timber with barnacles or other shellfish.

Coming to the second remedy—impregnation—the sulphate of copper process was tried, both as adopted at Amsterdam and by M. Boucherie, of Paris, but without success, it having no power to resist the teredo. Sulphate of protoxide of iron (green vitriol) was injected, but was found useless, and acetate of lead was equally inefficacious, as also mercurial and arsenical salts. The soluble glass and chloride of calcium process was proved powerless. Oil of paraffin injected into blocks proved of no avail, as in about two years fully developed teredos were found in all the pieces. A more favourable result is recorded of the oil of creosote process. Several pieces of oak, pine, and red fir were prepared, and placed in the water, fastened together by cross pieces of unprepared wood. It was found the teredo had penetrated at the junction of these cross pieces, even into the creosoted wood. Other trials with pine, beech, and poplar were made at the instance of Mr. Boulton, of London, who prepared the blocks at his works. In 1862, 1863, and 1864, towards autumn, these pieces were examined, and while the unprepared pieces placed near as counter-proofs were found each year filled with teredos, no traces of them were discovered in the creosoted pieces, except in the oak prepared at Amsterdam. Another examination in 1864 showed that all the pieces prepared by Mr. Boulton were intact. Creosoted oak was less satisfactory. Experiments with exotic woods were not fully made, though many hard kinds are not exempt from attack. We may point to the conclusions drawn by the commission. As regards coatings little reliance can be placed upon their perfect resistance, as they are liable to become injured, and the teredo can find an entrance in an unguarded spot however small. As to the impregnation of soluble salts, its inefficacy is attributed to the fact that the salts absorbed are extracted by the action of seawater. Hardness of wood is not an obstacle. The only preservative is the oil of creosote, though in employing it care is required that the oil be of good quality, and the impregnation thorough, and that woods be used that will absorb oil readily, as fir and other resinous woods. These conclusions are, we believe, confirmed by the leading engineers in the Netherlands, England, France, and Belgium.

Arbroath Abbey Parish Church, one of the oldest of the extension churches in Scotland—it having been built towards the close of last century—has just been thoroughly renovated, from plans by Messrs. Maclaren and Aitken, architects, Dundee.

A memorial is being completed at Buxton to the memory of Mr. Samuel Turner, late a native of the town. It is from the design of Mr. Robt. R. Duke, architect, and is Classic in style. The work has been carried out by Mr. E. Y. Ash, sculptor, of Buxton.

A new theatre, called the Gaiety, was opened at South Stockton-on-Tees, on Monday night week, by Mr. Wilson Furness, proprietor. The entire cost of the building has been about £3,000. The design was prepared by Mr. Thos. Raper, of South Stockton.

COMPETITIONS.

Bridlington Quay.—At a meeting of the committee, held on Tuesday, the 26th November, the clerk reported that he had caused advertisements to be inserted, offering the sum of £20 for the best plan and report thereon for erecting sea defences between Sand's Cut and Sand's-lane, and that five sets of plans and reports thereon had been received in reply to such advertisements, and such plans having been opened and inspected, it was resolved that the further consideration of such plans and reports be deferred to an adjourned meeting of the committee, to be held on Thursday, the 28th November, at half-past 9 o'clock in the forenoon. At an adjourned meeting of the committee, held 28th November, it was resolved that the board be recommended to award the premium of £20 to Messrs. Clarke and Pickwell, civil engineers, Hull. The chairman then remarked on the excellence of some of the plans, and particularly those of Messrs. Clarke and Pickwell, which were admirably worked out, and were superior to anything he had ever seen during his experience of public works.

Dublin.—In the limited competition for the Ball Memorial Church the design of Mr. J. F. Fuller, architect, of Dublin, has been accepted. The style chosen is Decorated Gothic, well treated, having a tower and spire with an apsidal baptistery at the west end.

Folkestone.—The sub-committee for the Dr. Harvey Tercentenary Memorial have invited Messrs. C. C. Birch, A. Bruce Joy, and Hamo Thornycroft to furnish designs for the statue of the discoverer of the circulation of the blood, to be erected on the Lees at Folkestone. Each of these three artists has accepted the invitation, and the designs are to be ready by the 1st day of March, 1879.

Goole.—The Reedness and Whitgift School Board have selected the design of Mr. Clamp, of Hull, for their proposed school at Whitgift, near Goole. Thirteen designs were submitted, chiefly by Yorkshire architects.

Halifax Board School.—187 architects have applied for the particulars relating to this competition.

SCHOOLS OF ART.

Barrow-in-Furness. — The first annual meeting that has taken place of the above school of art, since the removal from the old inconvenient rooms in the Mechanics' Institute to the newly finished and well-fitted up rooms in the Baths, took place last week, when a satisfactory report was read. The number of students attending the school during the past year had been 109. The school this year receives one National prize for machine drawing, gained by John Welsh, 3 second grade prizes, and 13 second grade certificates, and also several passes for various subjects. Amongst the local prizes was one for the best architectural design, which, after a close competition, was given to Joseph Fisher, and also one for the best design in any subject was gained by Alex. Pope.

Edinburgh.—The annual distribution of prizes to the students of the Edinburgh School of Art took place last week. The annual report stated that the number of students in the school this year was 864, much the largest number yet recorded. The awards from the Science and Art Department are much more numerous and of a higher order than those which were gained in the previous year. Those from the National competition are—*For the male school.*—1 gold medal, 5 silver do., 5 bronze do., and 9 Queen's prizes; as compared with 2 silver medals, 3 bronze do., and 4 Queen's prizes in the previous year. *For the female school*—1 silver medal, 1 bronze do., and 2 Queen's prizes; as compared with 1 bronze medal and 1 Queen's prize. The ordeal to which works in the National competition are subjected is shown from the fact that those to which the above prizes have been awarded, as well as those which have gained Queen's prizes, formed part of 1,500 works selected and referred to that competition out of 138,055 works sent up from 142 schools of art in the kingdom. The Science and Art Department have purchased for use as examples to other Government schools of art five of the works sent this year from the Edinburgh school to the national competition—viz., four out of the male school and one out of the female school. In the third grade examination, 38 students have been successful—viz., of the male school, 29; of the female school, 9. At the second grade examination, held in Edinburgh in May, 282 students of the school came up for examination—viz., from the male school, 152; from the female school, 130. This is 27 more than came up in the previous year. Out of the whole number, 152 passed, as against 129 in the previous year—viz., of the male school, 97; of the female do., 55. Of these, 29 from the male school have gained prizes, and 9 full certificates; while 11 from the female school have gained prizes, and 4 full certificates. The second grade examination was attended besides by 102 strangers—52 males and 50 females, of whom 61 have passed—viz., 40 males and 21 females. Of these, 9 have obtained prizes—viz., 8 males and 1 female. There was again this year a local advanced examination. The number of students who entered for this examination was 18—viz, 11 males and 7 females. Of these, 10 passed—6 males and 4 females.

Hastings and St. Leonards.—The third annual public meeting of this school was held on Wednesday week in the new rooms in Claremont, provided by Mr. Thomas Brassey's liberality. The report expressed satisfaction at the continued progress of the past year. The attendances had been maintained, but the number of Government prizes obtained had not been so large as in the previous year, owing to many of the older pupils having passed the curriculum. Mr. Sullivan, the head-master, reported that 27 students, and 7 external candidates, passed in the second and third grade examinations. Mr. Brassey, M.P., has just presented a series of books, casts, examples of building and machine construction, autotypes, &c., for use by members of the school.

Leicester. — The annual distribution of prizes to the students of the Leicester School of Art took place last week. The head-master reported that the attendance had been much the same as last year, the total number of students being 301; but the number of works executed by the students was much greater, the total being 1,431 against 902—an increase of more than half. Of the 902 works sent to South Kensington for examination last year, 11 obtained third grade prizes, whilst of the 1,431 submitted this year, no less than 35 received awards. The works of twelve students in the advanced section were selected by the department as having reached the fixed standard of excellence, and thus obtained the maximum grant to the school for being what are termed "satisfactory sets" of works. Last year nine of these advanced sets were chosen. In the elementary section, too, only five sets were chosen last year, whilst this year 22 sets were selected, and to two of these sets prizes were awarded for marked excellence, no similar awards having previously been made to the school. In last year's National competition one silver, one bronze medal, and three book prizes were awarded. This year are awarded one silver medal, three bronze medals, and one book prize. In the local time examinations of the second grade, 83 students were examined, of whose exercises 13 were marked "excellent," and 44 "pass." Last year 78 students were examined, 15 receiving the mark "excellent," and 29 the mark "pass." The total number this year is, therefore, 57, against 44 last year. Five "full certificates," for having passed in the four subjects of the second grade, were awarded last year—this year six. Free studentships were awarded to five students last year, and the same number this year.

A mission chapel was opened last week at Wootton, in the parish of Milton, Hants. It consists of a chancel (seating 200) and class-room, and has been erected by Mr. William Hoare, of Christchurch, Hants, from the designs of Mr. F. T. H. Chambers.

A special meeting of the Pontefract Town Council was held on Monday evening—the Mayor presiding—to decide upon the most suitable site to erect the new town hall. The proposed building is to be built by public subscription, some £3,000 having been already promised. It was ultimately resolved, after much discussion, that a competent architect should be called in to advise and prepare plans.

Building Intelligence.

Bootle in Liverpool.—On Wednesday last the new schools attached to the Emmanuel Congregational Church were formally opened. The exterior is of red sandstone with mullioned windows, &c., in the same style as the church, the interior being finished with stained and varnished pitch-pine. The large room is 60ft. by 36ft., having the class-rooms (16 in number) placed in two tiers at the south side, so arranged as to form part of the large hall when used for lectures, meetings, &c. A separate infant school is provided, and a library and kitchen on ground floor. Galleries run round the ends and one side of hall, which is—with the class-rooms—heated with hot-water pipes and ventilated on the Tobin system. Messrs. F. and G. Holme are the architects, and Mr. Samuel Webster the contractor; the cost, with fittings, being about £4,500.

Bradford.—The Alexandra Hotel, Bradford, which has been erected and furnished at a cost of between £40,000 and £50,000, was opened on Saturday. The walls have been almost entirely constructed of brick. The hotel, which is five stories in height, was designed by Messrs. Andrews and Pepper, architects, and has been constructed under the superintendence of Mr. T. Carrington, clerk of the works. The exterior is covered with cement. Accommodation is provided for 140 customers.

Chelmsford.—The Congregational chapel in London-road, Chelmsford, was re-opened last week, after undergoing extensive alterations and improvements, and somewhat elaborate decorations, carried out at a cost of £2,660. The flat ceiling has been removed over the central portion of building, and a domical ceiling constructed 10ft. above the original level, divided into 8 bays by arched ribs and principals. Surrounding the vault are panels, in the centre of each of which is a circular ventilator, communicating with the roof, from whence the heated air is extracted by three of Howarth's rotatory Archimedian screw ventilator. The gallery fronts have been reconstructed, divided into bays by consoles, and enriched with panelling and patterns. New open benches of pitch-pine, stained and varnished, have been fixed throughout the entire building; on the ground floor the seating is arranged in an octagon form round the pulpit and dais, with radiating passages. The new pulpit is constructed of framing of walnut, satin-wood, cedar, ebony, and pitch-pine, supported on a pedestal of pitch-pine, with columns and cantilevers of walnut. The central part of the street front has been filled in with windows and balustrade, between the Ionic columns, and crowned with a stone pediment. Mr. Charles Pertwee was the architect; Mr. Letch, of Braintree, carried out the builder's works; Mr. Tanner the plumbing and painting, and Messrs. Beckett Bros. the gas-fitting and ironwork.

Chichester Diocesan Association.—At the quarterly meeting, held on the 12th inst., the following building grants were voted:—Towards building a chapel of ease in Maresfield, £80; enlargement and restoration of Barcombe Church, £70; restoration of West Dean Church, near Sleaford, £25; enlargement of Christ Church, Eastbourne (2nd grant), £50; restoration of Mayfield Church, tower and spire (2nd grant), £15; and teacher's residence, Christ Church Schools, Eastbourne, £50.

Darenth. — On Saturday last the new Metropolitan Asylum for Imbecile Children at Darenth, Kent, was opened. The building was illustrated in the Building News of Nov. 5, 1875, and fully described on page 469 of the number for October 29, 1875, when a notice of the competition, in which Messrs. A. and C. Harston, the architects, were successful, was given. The adult asylum to be erected on the Darenth estate is for the ultimate accommodation of about 1,500 adults. Only 768 are to be at present provided for, in six blocks of 12 each, and 24 single rooms, but the administrative block, laundry, and workshops are to be completed at once, the remaining blocks added from time to time as required. The building contract for the parts now to be erected has been accepted by Messrs. Braid and Co.,

at £60,000. The united frontages of the buildings will amount to about half-a-mile. In addition farm buildings have been erected on the upper side of the wood included in the estate, and gas works at a point furthest from the buildings. The school is arranged for 500 children, exclusive of those in the infectious infirmary and bailiff's house. The building contract was taken by Messrs. Perry and Co., of Bow, London. The gates are of wrought iron, made by Messrs. Hart, Son, Peard, and Co., of London. The total cost has been £76,329, with £18,345 additional for works in connection both with school and asylum. The building is erected in stock bricks, with bands and arches of coloured bricks, and the style is semi-Gothic.

EDINBURGH.—It is proposed to erect a new German church in Edinburgh. Mr. James B. Wemyss, Leith, is the architect. The building is to be seated to accommodate 250 persons, exclusive of a proposed gallery at the east end. The style is Pointed Gothic. To the south of the entrance in the Bellevue front, a tower, square in plan, with buttresses rising from the base at each corner, will rise with its spire to the height of 80ft. from the pavement.

HEIGHAM.—The old parish of (St. Bartholomew) Heigham, Norwich, was reopened on Thursday, the 12th, after restoration and enlargement effected at a cost of £2,500. An aisle in the Decorated style has been added on the north side corresponding with that on the south, to which a new roof has been supplied. The tower has been refaced and a parapet added, and a new porch, vestry, and organ-chamber constructed on north side. The church has been seated with open oak benches, and paved with Minton's encaustic tiles, and a new pulpit and communion table provided. The windows are glazed with cathedral glass; heating apparatus constructed by Messrs. Barnard, Bishop, and Barnards. All the mural monuments, previously on the north wall, have been removed to a corresponding position in the new aisle. Mr. R. M. Phipson, of Norwich and Ipswich, was the architect, Mr. G. E. Hawes the contractor, and Mr. Owen clerk of works.

HEREFORD.—The foundation stone of a new Wesleyan chapel at Hereford was laid last week. The plans were drawn by Mr. W. E. Martin, of St. Owen-street, Hereford, and the contract was given to Mr. Reuben Taylor, of Clehonger. The building will be of brick, with buttresses of the same material. The style is Early Gothic. Sitting room will be provided in the new building for nearly 200 people, the dimensions of the interior being about 46ft. by 23ft. The roof will be open, of stained wood, while the walls will, with the exception of being coloured, remain plain, the bricks being pointed only.

HOUNSLOW.—We understand that the military brigade depot at Hounslow (one of the largest in the kingdom) is now rapidly approaching completion. The works were begun originally by Messrs. Niblett and Son, of Hornsey, but have been carried out chiefly by Messrs. Downs and Co., of the Borough, under the direction of Major Montmorency, C.E., and his foreman of works, Sergeant-Major Hamilton, R.E. All the locks, latches, and door furniture for upwards of 600 doors, have been supplied by Mr. James Hill, of Upper Thames-street.

LLANDAFF DIOCESAN CHURCH EXTENSION SOCIETY.—At the quarterly meeting of this society, held on Friday, the following grants in aid were made:—Newcastle, £30; Llanwonns, £40; Beaufort, £30; Oakwood Margam, £40; Mynyddislwyn, £20; Cyfartha, £30; Llanfrechfa, £40; Ebbw Vale, £30; Dowlais, £40; Pentrebuck, £40; Aberdare and Aberaman, £40; Cwmbach, £40; Pandy, £40; Ferndale, £40; Tonypandy, £25; Maesteg, £30; Spelter, £30; Pontlottyn, £40; Pantywain, £30; St. John's, Cardiff, £30; Gelligaer, £20; Pontaberbargoed, £30; Whitchurch, Tongwynlais, £30; All Saints', Cardiff, £30; Roath, £40; Llantrissant, Ely Valley, £20; Ystradyfodwg, £30; and Maescywmmer, £30.

METROPOLITAN BOARD OF WORKS.—At this board on Friday it was decided to contribute the following sums towards improvements recently carried out by the City Commissioners of Sewers, being one-half the cost in each case:—Poultry from Old Jewry to Ironmonger-lane, £11,000; corner of Jewin-street, £11,801; Long-lane, setting back Nos. 4 to 8, £1,025; improvements in Aldersgate-street, Long-lane, and Cloth-street, £1,604, and further improvements in Long-lane, £2,500 and £181. A letter was read from the Home Secretary stating that the Government do not see their way to further the proposed scheme of the board for the purchase of the water companies of the metropolis. The works committee brought up the accounts of the analytical chemists employed to test samples of water with a view to supporting the water supply and purchase bills promoted by the board last session; those had been reduced from £1,901 to £1,614, and they recommended that the same be paid. A long discussion ensued, it being contended on the one side that these charges were still excessive and scandalous, and on the other that they comprise fees for analyses of all the present and possible sources of supply, which will be, it was said, most useful in any future action taken by the board. Ultimately it was decided to refer the bills to the finance committee for payment by 19 votes to 17, but the item of the special fees charged by Mr. Keates, analytical chemist to the board, was adjourned for a month for consideration. The fire brigade committee were authorised to take steps to provide another station in Tooley-street in place of the present one, which will be removed under the Streets Improvements Act, and to expend £850 on enlargements to premises in Waterloo-road.

NEWCASTLE-ON-TYNE.—An addition of considerable magnitude has been made to the buildings of the Newcastle-on-Tyne Industrial Dwellings Company. It consists of a large central block, with two wings stretching from it right and left, and short flanking sections returned from the main building at each end. The central block is six stories in height; the whole of the wings and flanking buildings are four stories. The materials used for the old portion of the building was rubble, faced with brick; but the new portion—which considerably more than doubles the accommodation at command—is built of brick only. The length of the main building is 412ft., and the height of the central block is 60ft., and of the wings about 40ft. The architect is Mr. J. Johnstone, of Clayton-street, Newcastle. The staircases are laid with granite concrete by Messrs. W. Wilkinson and Co., Newcastle. Mr. Jacob Glaister is clerk of the works. The entire cost of the new building will be about £12,000.

PENYCAE.—The inaugural service of the new Church of St. Thomas, Penycae, took place on Friday week. The new building (illustrated in the BUILDING NEWS in 1877) will accommodate 300 persons, and has been erected for the sum of £1,800, being at the rate of £6 per sitting. The church consists of nave, 54ft. by 24ft.; chancel, 22ft. by 20ft.; aisle, 52ft. by 7ft.; and small vestry and organ-chamber combined, with heating apparatus and coal cellar under; the height of the nave being 32ft. to the ridge. The style is a severe Lancet one, no tracery being introduced, with the exception of one small rose window in the east wall. The walls are built in local stone, plastered internally, and the roof is boarded and slated, with felt between, for warmth. The work has been thoroughly and substantially carried out by the contractors, Messrs. Phennah and Davis, of Rhostyllen, under the personal superintendence of the architect, Mr. Aston Webb, 3, Duke-street, Adelphi, London.

STOW-ON-THE-WOLD.—The old cross, situate in the market-place, which was erected between 1445 and 1476, has been restored by public subscriptions, as a memorial of the late Mr. J. C. Chamberlain, lord of the manor, in commemoration of his gift of £2,000 to provide the town with water. A substantial iron railing has been placed round the cross, and a piece of carved stone added to the top of the column. Upon the east side of this addition is sculptured Mr. J. C. Chamberlain and Maugersbury House, on the west side A. Chester, reputed builder of the cross, on the north side the Abbot of Evesham and the lord of the manor obtaining a charter from Edward III. to constitute Stow a market town, and on the south side the Crucifixion. Messrs. Estcourt, of Gloucester, were the contractors.

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RECEIVED.—B. of M.—J. F.—F. C.—E and R.—Rt. Hon. L. J. M.—W. F.—A. and J. G.—F. and A. W.—H. and G.—J. L. B. and Co.

A. and K. (It was undoubtedly a sharp piece of practice, but we cannot deal with it—first, because the party referred to is not an architect; and next, because there was nothing in the course he adopted against which a legal objection could be raised.)—B. R. (We do not know. The "Elizabethan rim locks" are made by Mr. J. Hill, of Upper Thames-street—see advertisement in this number.)

"BUILDING NEWS" DESIGNING CLUB.

DRAWINGS RECEIVED.—East Anglian, Anchor, North-West, Motto J., J. S., M with leaves, Cabul, Montague, S. C., M in square, En Avant, Such a Dog, Pat, Try.

RECEIVED.—A SWASH.—(1. The bowling-alley and skittle-ground need not be shown, but simply the approaches thereto. 2. Yes.)—J. S. (You may send a drawing for both subjects if you like; but we prefer perspective sketches, if sent, to be on the same sheet.)—G. S. F., North Shields. (There is no subscription to pay to join the club.)—B. (Our sheet being 11in. by 7in., generally speaking, drawings for reproduction should be 22in. by 14 in.)—MOTTO J. (By some inadvertence your drawing was mislaid, and we omitted to notice it. The detail of fireplace and staircase are characteristic, and the mouldings effective, though we think the framing of meeting-hall door heavy. We shall make a note of it.)

Correspondence.

PROFESSIONAL PRACTICE AND ETIQUETTE.

To the Editor of the BUILDING NEWS.

SIR,—I must confess to much disappointment at the evasion or postponement of the point raised by Mr. Burges's paragraph No. 7 in the above matter. I and many others have been waiting for years past to see this question raised and settled one way or other. Canvassing and touting for business have become so common that in many places it is the only possible way a professional man has to procure business or keep his practice together. I do not now write either to defend or condemn it. I merely suggest that the legitimacy of the practice should be recognised or condemned, so that one set of men should not have an undue advantage over others. It is quite time the subject should be faced honestly. We look to the Institute to take a leading position, and enlighten public opinion on this matter. Failing this I trust some influential members of

our profession will air the subject in your columns. There are many men, even eminent ones, who owe their positions entirely to the practice I name. Surely they will not be backward in publicly defending it.—I am, &c.,

B.

CUSTOMARY PERCENTAGES.

Sir,—It came under my notice a short time ago that a quantity surveyor who had supplied the "bills of quantities" for a large city public work (charging a commission equivalent to 2 per cent. for them) also undertook, with the concurrence of the contractors and the sanction of the architect, to make out and furnish all the contractors' amounts (both day and measured) for which service he charged another 2 per cent., which latter commission was added to and incorporated with the accounts, but so disposed of as not to be observable, and therefore payable to him by the contractors, and also in connection with the same contract, the "omission" on credits to the clients bore 1 per cent. commission, the same being payable to him by contractors as before, to provide for which the real amount of the contractor's indebtedness (the client's credit) had to be reduced the said one per cent. I expressed my surprise at such proceedings. I consider them most unfair and a great injustice to the payers, and was answered "it was customary."

Now, Mr. Editor, will you or some of your eminent professional contributors favour me with your (or their) opinion thereon, and say if within the range of your (or their) experience you (or they) can call to mind a precedent for such transactions and modes of charge as regards the amounts (debits) and the "omissions" (credits)?

Commissions of varied percentages on bills of quantities are usual, but not the more just for being so. However, those will pass over as customary evils.—I am, &c.,

Constant Reader.

THE A. A. BALLOTING.

Sir,—I see by the reports of the meeting on the 6th inst. that Mr. Florence again repeated the assertion that "one black ball would neutralise five favourable votes:" so I suppose that this was the reckoning adopted. But rule 10 says "one dissentient vote *in* five shall exclude," by which one black ball would neutralise only *four*. Thus, if there were thirty-three votes for a candidate, and seven against him, he would be excluded by the reckoning apparently used. But there would certainly not be one in five of the forty voters against him. This may account for some of the rejections.—I am, &c., Y. Z.

A third serious landslip has occurred to the new dock at Devonport, of which we announced the laying of the foundation stone last week. At daybreak on Monday it was discovered that between 200 and 300ft. of the south side of the dock had given way, carrying with it the solid masonry and destroying building material to the extent of many thousands of pounds. A large fissure was also caused in one of the main roads of the yard, and the water-pipes being broken, hundreds of tons of water poured into the excavations and completed the wreck. The works are now stopped.

A Loan Science and Art Exhibition is to be held in the Grammar-school buildings, Bedford, during part of the Christmas holidays.

The School Board for Carlisle have instructed Mr. Birkett, of that city, to prepare plans for a new Board school to accommodate from 650 to 700 children, at a cost of about £8,000. The site is in Denton Holme.

The tender of Mr. Alfred Robinson, of Holborn, has been accepted this week by the Dean and Chapter of Salisbury for the new screen and other woodwork for the choir of their cathedral, from the designs of Mr. G. E. Street, R.A., the recently appointed architect to Salisbury Cathedral.

Last week the foundation stone of a Board school, to be erected at Eastborough, Dewsbury, was laid. The building, which will cost £7,000, and accommodate 900 children, is from designs by Messrs. Holtom & Connon, of Leeds and Dewsbury, architects. The style is Geometrical Gothic. The contracts are let to local firms.

It has been decided to add a spire to the recently-restored parish church of St. John, Margate.

Extensive improvements and alterations are in progress at the Theatre, Preston. Mr. J. Whiteside, of Old Vicarage, Preston, is the contractor for building works and joinery. The decorations are being executed by Messrs. Wilding & Sons, of Lune-street, and the upholstering by Mr. Hargreaves, also of Preston.

Intercommunication.

QUESTIONS.

[5615.]—**Sashes and Frames.**—A person was about to build some houses, and took a joiner to examine some windows, and requested him to furnish a price at which he would make him sashes and frames corresponding in every respect with the sample windows. These windows had beaded hanging stiles to the ground-floor windows (but no shutters), and the upper windows had angle beads in the reveals and under arches outside. The joiner agreed to make them in every respect like the sample windows at a price per foot superficial, but has not affixed either hanging stiles or angle beads, saying he considers that, although he agreed to make the sashes and frames in every respect like the samples, he was not bound to affix either hanging stiles or angle beads. In arguing the matter before a referee, the latter said he considered the sashes and frames were complete without either hanging stiles or angle beads, as these were merely ornamental. Kindly give opinion, and oblige—J. J.

[5616.]—**Expiration of Articles.**—Will any reader kindly inform me what is the legal form of endorsement on indenture, on expiration of articles served under an architect and surveyor?—Z.

[5617.]—**Brown Oak.**—Could any of your correspondents learned in oak afford information as to the so-called "brown oak" now much used in furniture? Is there such a wood, or is the dark colour created by the cabinet-maker?—J. P.

[5618.]—**Etchings.**—Will any reader kindly inform me what kind of frames (and mounts, if any) are best suited for etchings?—Subscriber.

[5619.]—**Surveyor's Practice.**—Can I, as a surveyor, legally assess the damages done to a business through loss of trade, &c.; also inconvenience to inmates, &c., caused by the pulling down and re-erection of adjoining property; or do I require a licence?—Birmingham.

[5620.]—**Levels.**—Will some kind reader answer the following? I can take levels, but do not know how to set out work from them. For instance, in draining a district, how are the several depths of the drains, taken from the section, set out upon the ground?—X.

REPLIES.

[5580.]—**Architects' Charges.**—I beg to express my thanks for inserting my inquiries on the above subject, and to "G. H. G." and "Conciliator" for the kindness of their replies on Nov. 15, which will be of great assistance, and must have given them considerable trouble. With your permission I would remark on "Conciliator's" reply to No. 7—that grates and chimney-pieces were shown on the drawings to be new and of suitable design for a mansion. To think out old ones would, as he says, be superfluous; and if he would draw the line in favour of the client here, would it not clash with No. 1, in which he says: "Charge 5 per cent. on amount of contract and extras, including (at builder's prices) things provided by employer?"—Provincial S.

[5603.]—**Corn Exchange.**—The Corn Exchange at Peterborough is lighted exclusively from the roof.—W.

[5609.]—**Winfried of Kirton.**—Winfried of Kirton was St. Boniface, Archbishop of Mayence, the Apostle of Germany. He was born in or about the year 680, at Kirton (Crediton), in Devonshire. Of royal descent, he was related to St. Walpurga, and passed 30 years of his life in the monastery of Excancestre (Exeter). After that he appears to have removed to the monastery of Nutcell, in Winchester. His monument may be seen in Mayence Cathedral, and, if the stone is to be believed, he possessed a good old Saxon face. His heart was preserved in a silver case in the chapter-house of the same cathedral, but the French disinterred it, and stole the casket. The spot where it was originally buried, however, is still shown. "Kirton" is a local pronunciation for Crediton, still in general use in Devon. It is the name, too, that is generally used abroad when reference is made to the birthplace of St. Boniface (Winfried).—Harry Hems.

[5612.]—**Church Restoration.**—"Harrow" has put some questions that would puzzle even the strongest restorationist to answer without seeing the church. I do not quite understand what position the octagonal arcade occupies. Does it surround the tower at the top? Another question is, what part requires most restoring—the tower or the roof? This is important before an answer can be given. If the roof is not an interesting one, and is further unsound, there can be no doubt the best course would be to substitute a new roof, so that the ridge may clear the arcade; but, unless there is room to do this without reducing the pitch of roof, both had better be left alone.—G. H. G.

[5613.]—**Clay Foundations.**—If the clay subsoil is not subject to damp, and is well drained, a bed of concrete from 1ft. to 1ft. 6in. would be sufficient, within 12in. or so of the ground level. These are ordinary depths for small houses. A good concrete can be made of screened gravel, mixed with sharp sand and blue lias lime, in the proportion of 6 of ballast, &c., to 1 of lime.—G. H. G.

[5614.]—**Laying out Houses.**—"Pecksniff's" question is a somewhat vague one to answer. An architect should certainly make himself acquainted with the levels of the site he intends to build on, but if the site is nearly level a common spirit level applied to a straight edge or rule would suffice. Having determined the position of the house, which should be regulated chiefly by aspect, and the prospect from the principal windows, &c., it is customary to run a level through the centre in each direction. The most desirable method is to fix upon an angle, and run the levels in both directions of ground, the level of entrance or the general floor level being determined as a datum point. The most useful instrument for the architect's purpose is a small brass mounted level with sight pieces, adjusted by parallel plate-screws to a tripod. An architect ought to understand levelling, and if he cannot obtain the levels by reference to an ordnance survey it is desirable he should take them himself. In many instances the duty is shirked, the plans and sections are prepared by assuming a level, and the difference has to be paid for in so many cube yards of excavation, or concrete, or in rods of brickwork, and the client grumbles and pays, but the result is unsatisfactory.—G. H. G.

PARLIAMENTARY NOTES.

Ancient Monuments Bill.—In moving the second reading of this bill, on Tuesday, Sir J. Lubbock said that as the House had on several previous occasions affirmed the principle of the bill, he thought hon. members would not wish him to enter into the subject at length on the present occasion. He would only observe that the principle of the bill was that, after proper notice had been given, an owner of one of these monuments who wished to destroy it should, at least, give the country the option of purchasing it at a fair price. As regarded the constitution of the commission and other details, he did not ask the House to commit itself, though, for his part, he believed it would work well, but he should be most ready to consider any suggestions with reference to it in committee.—Lord F. Hervey asked whether that was the same bill as the hon. baronet had introduced in previous sessions. He had understood that the hon. baronet was prepared to make considerable modifications in its provisions.—Sir J. Lubbock said he had adopted all the recommendations of the select committee which sat on the measure and also other suggestions for removing objections.—The bill was then read a second time.

Railway and Tramway Extension.—Mr. Delahunty, M.P., supported by several of the Irish members of the House of Commons, will introduce into Parliament a measure providing for the extension of railways and tramways in Ireland, and proposing to empower the Loan Commissioners, with the consent of the Lords of the Treasury, to advance the cost of the construction of railways and tramways in districts where the traffic is not sufficient to call local enterprise into operation, but where the inhabitants and others interested are willing to guarantee the annual interest and sinking fund on the cost of construction. A clause in the measure proposes to extend its operation to any place within the three kingdoms.

The Town Council of Carlisle decided at a meeting held on Tuesday week to proceed forthwith with the new sewage works. The plans have been prepared by Mr. McKie, the borough engineer, and provide for disposal by irrigation on land at Willow Holme. A proposition was made that, having regard to the length of time since the scheme was resolved upon, and the greater experience which has been acquired on the subject in other parts of the kingdom, that the advice of "some eminent engineer" should be sought on the whole question of disposal, but this was defeated.

The trustees of the Harpur Trust, Bedford, decided at a meeting held on the 13th inst., to raise a capital sum sufficient for the erection and fitting up of a modern school for girls, and of buildings in connection therewith. The school is to accommodate between 200 and 300 girls, and will be built in the Bromham-road, Bedford. At the same meeting it was agreed to appoint a surveyor for the charity estate in Bedford, and a committee was instituted to draw up a list of duties.

Ilfecumbe, Devon, is to be lighted with gas on and after the 1st of January. Mr. Willay, gas engineer, of Exeter, is carrying out the undertaking.

Extensive alterations have been carried out at Pontardawe union-house, from the designs of Mr. Fowler. Mr. Rees was the contractor.

The local rural authority for Knockando, N.B., have under consideration plans prepared, by their instructions, by Mr. H. J. Mackenzie, C.E., of Elgin, for waterworks for the village of Archiestone, and have ordered analyses to be made of the proposed sources of supply.

At a public meeting of the ratepayers of Maryport, sanction has been unanimously given to the bill to be promoted in Parliament by the harbour trustees, for the construction of a capacious wet dock on the south side of the present harbour. The estimated expenditure is £100,000.

Our Office Table.

A SPECIAL JURY was summoned in the Middlesex Sheriff's Court on Wednesday to assess the amount to be paid by the Metropolitan Board of Works for the Battersea and Albert-bridges, which are to be freed from toll. The Albert-bridge Company claimed £300,000. Sir H. James informed the court that an arrangement had been entered into by which the jury would be spared a long inquiry into the matter. Mr. Pope said it had been agreed to let the case be determined by arbitrators, with the appointment of an umpire. There would be an inquiry into the substantiality of the structure and other matters, which would be better ascertained by the tribunal he had mentioned. The assessor said he thought the course suggested was the best for all parties. The jury were therefore discharged.

MESSRS. HUDSON AND KEARNS, of 83, Southwark-street, have sent us specimens of their architects' and builders' diaries, the novel and valuable feature of which is, that each volume forms in itself a complete set of books for the year. Nos. 9 and 10 are intended for universal use. Nos. 12 and 13 are particularly good and comprehensive; they are ruled and printed especially for the use of architects and surveyors, but would be serviceable for all engaged in business, as they comprise, amongst other things, a diary, a note-book, a cash-book, and a ledger, the whole being paged and indexed so that reference may be immediately made to any particular name or transaction. No. 11 is prepared for the use of builders and contractors, and contains a large number of very useful tables. The patent diary blotting pad is very useful, combining in one article two most serviceable things.

At the meeting of the Institution of Civil Engineers on the 10th inst., a paper on "Railway Work in Japan" was read by W. F. Potter, M. Inst. C.E. In the course of his remarks the author stated that the materials found in the country for construction were not very good, except timber, which was abundant. It was impossible to furnish any reliable information as to the cost of the works, as the Japanese officials avoided giving particulars on this point to the foreign staff. The chief engineering difficulty in Japan was the treatment of the watershed. The beds of the rivers were nearly all higher than the surrounding country, varying from a few feet to 40 feet, or more. In some instances the railway had been taken under the rivers by tunnelling, and an example of this was given. As a rule, however, the rivers were bridged over, and approached by steep gradients and high embankments. In the future development of railway work in Japan, two essential points were necessary—greater economy of construction, and the introduction of English capital and enterprise. These could be obtained if the principle of surface lines were adopted, and the natural jealousy of the Government of foreign interference were removed.

AT a meeting of the Pharmaceutical Society last week a paper by Dr. Stevenson Macadam was read, in which the latter called attention to a number of experiments proving the presence of arsenic in soot. Trials made on different samples disclosed the fact that arsenic was present in greater quantity in soot taken from near the fireplace than in that obtained from the chimney pot. The more pyrites a coal contained the more arsenic might possibly be found; but although the arsenical vapour must pass into the atmosphere, Dr. Macadam was not prepared to say that it was of any practical moment in a sanitary point of view.

THE twenty-ninth annual report of the National Freehold Land Society speaks of continued prosperity and progress. The subscriptions during the year ended October 31st, 1878, were £572,525, the withdrawals £563,386, and the members' capital at the end of the year was £1,341,109, being an increase of £19,628 on the previous year. The "convertible securities" have been increased from £139,098 to £196,182, and the advances on freehold and leasehold securities now amount to £1,194,099. The rate of profit on uncompleted shares was 3 per cent., and of interest on completed shares 4 per cent., throughout the year. The gross profit for the year was £69,723. Of this sum the profit and interest paid to members amounted to £49,266, and, after paying expenses and writing off losses, the reserve fund has been increased from £36,280 to £47,174. The division of office and staff desired by the British Land Company has been carried out, and is found to work satisfactorily.

WE have before us "Classical Works of the Architecture of the Middle Ages and the Renaissance Period of Germany," and "New Works of Architecture at Frankfort-on-Maine," both introduced by Mr. Davis, of 201, Old Kent-road, London, S.E., agent of Henry Keller, Frankfort-on-Maine. The first is a series of photographic plates (large folio), taken by means of a recently invented method, by which fading of the picture through the influence of daylight is prevented, enabling the publisher to deliver copies to subscribers at a much cheaper rate than would otherwise be possible—portraying the masterpieces of architecture brought into existence in Germany during the Romanesque, Gothic, and Renaissance periods, including the celebrated Castle of Heidelberg, and the noted old hotel, "Der Ritter." The latter illustrates the more modern erections of Frankfort-on-Maine, the selection being made by the Society of Architects and Engineers of that country. The low rate of subscription and the high character of these productions should place them in the hands of the majority of our readers.

PROFESSOR EDWARD M. BARRY, R.A., will deliver a course of six lectures on architecture at the Royal Academy, at Burlington House early in the new year. The lectures are primarily addressed to the students of the Royal Academy, but other persons will be admitted by tickets as far as space may permit. Applications for tickets to be addressed to the Professor of Architecture, at the Royal Academy, or 21, Abingdon-street, S.W. The following is a synopsis of the course:—Jan. 30th, Recent Artistic Losses, The Gothic Revival and Sir Gilbert Scott; Feb. 6th., Italian Gothic the Precursor of the Renaissance; Feb. 13th, Italian Gothic in Secular Architecture; Feb. 20th, Early Renaissance, Brunelleschi; Feb. 27th, Second Period of the Renaissance, Bramante and Sansovino; March 6th, Third Period of the Renaissance, Palladio and Vignola.

THE works which for the last two years and a half have been in progress at the Waterloo Terminus of the South-Western Railway will be brought to a finish by the end of the year. Something like £120,000 will have been expended, and an immense improvement in the working capabilities of the line will have been effected. The entire separation of the main line from the suburban traffic has been effected by the erection of what is practically an entirely separate station, running back from the Waterloo-road for over 300 yards. In various parts of the new station are three hydraulic lifts. One is in the front of the building, adjacent to the staircase leading from the level of the roadway up to the platform. This will be used exclusively for the conveyance of luggage up and down between the outside cab ranks and the platforms. A second lift is towards the rear of the station, and will be devoted to the conveyance of lamps to and from the platform, after the method adopted at Paddington and other large stations. The third is situated on the arrival platform, and by this milk-tins will be lowered. Trains first ran over the new line on Monday, but the building is still in the hands of the contractors, Messrs. Perry and Co., Tredcar Works, Bow.

WE have received a small pamphlet which treats the subject of ventilation in a simple and efficacious manner. Mr. Ellison's principle, though not new, is to admit air at the lower part of the room through conical-shaped perforations made in air bricks, skirtings, or other substances, instead of through straight or cylindrical apertures as usually adopted. The object of the conical opening is to prevent a sudden influx or draught, and to diffuse the currents of air as much as possible. The force of the incoming current entering the outer and smaller end of the opening is by this means diminished in its passage in the proportion of the larger area of the inner end of the opening to the outer one. By lengthening, and at the same time enlarging the cone-shaped openings, the velocity becomes diminished, and the intensity of current reduced, the air radiating and spreading itself. Mr. Ellison applies his system to skirtings, air bricks, and other materials. In the case of skirtings, the space behind can be utilised as a warming chamber by hot water or steam pipes, or the space under seats in halls or lecture-rooms may be made to answer the same purpose. Cornices may be pierced in a similar manner for the escape of vitiated air, and the method admits of a variety of obvious modes of application. The air may be conveyed through flues in the wall by air shafts or otherwise to "box ventilators," in which metallic perforated frames filled with porous non-conducting material are introduced for the purpose of equalising the temperature of air. The author, alluding to conical-shaped outlets, observes that the idea entertained of their giving an increased pressure to the air passing out and thus resisting currents having a tendency to enter is a mistake, as the pressure through a straight aperture of the same size as the small end of cone is the same. The conical perforations are made of all sizes according to the pressure likely to be brought to bear upon them. At Leeds, in the rooms of Lincoln Fields Sunday School, the system has been applied successfully in one case as a skirting, and in others by placing nearly 200ft. of perforated wood at right angles under the seats.

AN old and valued correspondent writes:—"On page 155 of the volume of the BUILDING NEWS for 1857, appeared the following:—'A thoroughfare is certainly wanted on the line of Old-street, Liquorpond-street, King's-road, Theobald's-road, and Hart-street to New Oxford-street, and if carried out comprehensively it will pay well, and present a good line, for Hart-street, King's-road, and Old-street are wide, and have various buildings of consideration, as St. George's, Bloomsbury, and St. Luke's, and possibly something might be done with Gray's-inn-gardens, while the British Museum awaits an approach. The open space of Bloomsbury-square likewise comes into the street, adding to its effect, so that as old Brown used to say, it has "capabilities." The plan for this line has been submitted to the superintending architect.' It has taken twenty-one years to get this line into execution!"

LEGAL INTELLIGENCE.

GAS COMPANIES AND LOCAL BOARDS.—At the Gosport police-court last week, the Gosport Gas and Coke Company were charged with having, between the 9th and 23rd day of November, neglected to leave at the offices of the Alverstoke Local Board plans of new buildings they intended to erect at their works at Newtown, together with a description of the materials to be used in the construction. There was a further charge of failing to give notice in writing of their intention to erect such new buildings. Philip Stiff, the contractor, was also charged on these two counts with neglecting to deposit these plans. Mr. A. S. Blake, for the local board, mentioned that by sec. 157 of the Public Health Act, 1875, the local authority had power to make bye-laws, under which they were empowered to compel parties about to build to deposit plans. The present prosecution was taken under bye-law 30, in accordance with the quoted section of the Act of Parliament. There was one saving clause to this section of the Act, but that applied only to railway companies, for the obvious reason that railways came under the direct jurisdiction of the Board of Trade; but of all companies a gas company would be required to carry out the provisions of the Act of 1875. The local board were bringing this as a test case, preferring to summon a large company in the outset to a smaller defendant. Mr. R. W. Ford indicated that his only defence would be that the prosecution, so far as it extended to his clients, was *ultra vires*. The bye-law being bad the case could not stand. He consented to admit all formal evidence. His contention was that with regard to this company, like all similar companies throughout the kingdom, so far as he was aware there had never been a case in which a public company, with statutory powers and statutory responsibilities, had been brought into court under similar circumstances for the purpose of enforcing a penalty, either under the Public Health Act of 1868 or the Local Government Act which was passed subsequently, and contained similar powers to those respecting persons erecting buildings; nor

indeed, under the Act of 1875, had the question been raised in any court as to the duty of statutory companies with statutory responsibilities to submit the plans of their works to the local authority for approval. He contended that no gas company, or any other company, were bound, nor should be bound, to submit the plans of their works. His contention upon the question of law (he admitted the facts) was that no general Act of Parliament, passed subsequently to a special Act of Parliament, could be held to repeal, alter, or modify any previous special Act of Parliament, unless there were express terms in the general Act indicating the positive intention of the Legislature to so alter, repeal, or modify. That was the broad principle upon which the whole case depended, and he quoted Chief Justice Bovill, Justice Willes, and other eminent judges in several cases which had been decided in this way, while in no case had a contrary judgment been given. He contended also that this law was based upon good reason, because were the gas bad or were other defects found in the arrangements and management of the company, they would be liable to a heavy penalty—and would the local authority say that, by interfering with the plans and giving them their approval, they would share the responsibility? He mentioned that the plans had been drawn up under the supervision of Mr. Thomas Hawksley, one of the greatest authorities on gasworks architecture, and proceeded to quote the company's Act of Parliament to show that they were empowered to make, improve, erect, and lay down any works for the purifying of their gas, and make retorts, reservoirs, &c., on the land scheduled to them, and to do such acts as they might think proper for making and storing gas. He contended, therefore, that as the company were erecting a purifying house on land scheduled to them in the Act passed prior to the approval of the bye-laws, they were not guilty. Mr. Blake replied on the question of law, contending that the general Act did not supplant, but added to the special Act, and rendered it imperative upon the company to submit their plans. Supposing the board refused to accord approbation, then the company would have the same right of appealing as everybody else would have. Colonel Mansel said said that the magistrates had come to the conclusion that defendants had not complied with the law. The court gave a verdict against them, and in each case they would be fined 1s. and costs.

Vestries and their Powers over Builders.—On Friday the attention of the Hackney District Board of Works was called to a communication mentioned in the following terms in the agenda paper of the Metropolitan Board of Works:—"Letter from the Lewisham District Board calling attention to the inconvenience occasioned to the public in the outlying districts from the formation of new streets being sanctioned by this board without imposing any condition that the ground laid out for the streets should be put into passable condition for traffic prior to any houses being erected in it, and urging upon the board the necessity for imposing a condition to the sanction of new streets that they should be at once formed, and made to the satisfaction of vestries," &c. The clerk of the Hackney Board of Works, Mr. R. Ellis, said this matter would affect all the outlying districts, such as Hackney and Islington, but not Shoreditch, St. Luke's, or the other parishes nearer to the city; and it involved really the question whether something should not be done, pending the operation of building, to compel the builders to do something to the roads on which they erected their buildings by making certain conditions when sanction was given for such roads. He scarcely could approve of the last clause, because the roads would so soon be allowed to go out of repair. The chairman (Mr. Deputy Kelday) said he scarcely saw what the board could do in the matter on its first reception; it should go to the general purposes committee. It was, in fact, a suggestion that fresh powers should be obtained by the Metropolitan Board of Works to enable district boards and vestries to acquire more power over builders. This could only be obtained by Act of Parliament. Mr. C. Green moved the reference of the matter to the general purposes committee. Mr. G. B. Holmes seconded it, but he desired to remind the board that it already possessed powers—for instance, as to building lines—which it did not put into practical effect, but which were really allowed to become obsolete and dead letters. The motion was carried, and the matter was referred to the general purposes committee for consideration and report accordingly.

STAINED GLASS.

Tadcaster.—This church has just received an addition in the form of a stained glass west window. It has for its chief illustration a representation of the Redeemer addressing his disciples and the people on the Mount. The design and execution of this work, as also the five-light window in the south aisle, is by Messrs. Powell Brothers, of Leeds.

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CHIPS.

The memorial stone of introductory buildings in connection with the proposed Dulwich-grove Congregational chapel and Sunday school was laid on Saturday afternoon. Mr. James Cubitt is the architect.

Mr. Henry Dawson, the landscape painter, formerly of Nottingham, died on Friday at Chiswick.

A two days' inquiry was held at Waterford, on Thursday and Friday in last week, before Mr. Hamilton, an inspector from the Local Government Board of Ireland, with reference to an application from the Town Council for sanction to borrow £15,000 for the completion of the Waterford waterworks. Considerable opposition was raised to the scheme.

Two stained glass windows have been placed on the south side of Wool parish church, Dorsetshire. Each portrays two of the Evangelists, surmounted in the tracery by their emblems, and at the foot of the lights are memorial inscriptions. Messrs. Clayton and Bell carried out the work.

The United Methodist Free-Church chapel and schools at Holloway, Derbyshire, are about to be enlarged, and the chapel reseated. Mr. George Eyre, of Codnor, is the architect, and Messrs. Wheeldon Brothers, Belper, and Mr. Limb, Ambergate, are the contractors.

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Trade News.

WAGES MOVEMENT.

Bangor.—The dispute at the chief Bangor slate yards consequent upon the employers' demand for an extension of working hours until 4 o'clock on Saturdays has taken a serious form, owing to an anonymous threatening letter with the representations of a coffin and a pistol having been received by the chief manager of the slate quarries. The strike committee warmly disavow all connection with the letter.

Buxton.—At a meeting held last week of the Buxton Master Builders' Association it was unanimously agreed to reduce the wages of joiners and masons—the former from 8d. to 7d. per hour, and 50 hours instead of 49½; and the latter from £1 16s. per week to £1 8s. 6d. for the winter months, and £1 11s. 3d. per week of 50 hours for the summer months.

Edinburgh.—A fortnight ago the Edinburgh and Leith Builders' Association gave notice to the executive of the Operative Masons' Society of their intention to reduce the rate of wages immediately from 7½d. to 7d. per hour. The workmen at that time deferred action in the matter till the masters specified the date of the proposed change. This was duly intimated to the operatives, who have, it seems, submitted to the reduction. It may be mentioned that this makes a reduction of 2d. per hour on the rate of wages, or 8s. 6d. per week, since the month of May. About eight weeks ago a partial strike occurred amongst the masons of Edinburgh, owing to the masters having given notice of a reduction of 1d. per hour, but ultimately the matter was compromised by the workmen agreeing to one-half that amount and a modification of the bye-laws. At the present time hundreds of masons are going about idle in Edinburgh, owing to the dulness of trade.

Elgin, N.B.—The master carpenters of Elgin have given their men notice of a reduction in wages from 6½d. to 6d. per hour, to come into force on the 13th of January, and also of an intention to propose the abolition of the present bye-laws.

Oxford.—A strike at Oxford has been averted. The master builders of the city met a deputation of carpenters in the City-buildings, and after some discussion it was agreed that the wages should be reduced ½d. an hour from the 28th of December. A set of rules was drawn up and agreed to, by which for the future it will be necessary that six months' notice shall be given on either side before any alteration is made.

Southport.—The master joiners and builders of Southport have given notice that in consequence of the present depression of trade they will reduce the wages of their men to 7½d. per hour, the reduction to take effect from January 31. It is likely that opposition will be offered.

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N.B.—DIAGRAMS AND PROSPECTUSES ON APPLICATION.

THE BUILDING NEWS.

LONDON, FRIDAY, DECEMBER 27, 1878.

ENGLISH WRITERS ON THE FIVE ORDERS.

THE great revival of Classic art which has been traced to Florence as a birthplace was comparatively late in reaching our shores. As early as the year 1485 the works of Vitruvius had been printed at Florence; and in the same—or, perhaps, the following—year an impression of the ten books of this author was issued from the famous press of George Herolt, at Rome. About the same date, but after the author's death, the works of Leon Battista Alberti were published at Florence (probably in 1485); and from that time forth all the chief printers of Italy were busy with editions of Vitruvius, and the works of the numerous writers and commentators on the ancient architecture, which was rapidly growing in favour, and whose exponents were gaining patrons among the wise and powerful rulers who governed Italy at that time. These princes gave to Italy the series of magnificent buildings of the Renaissance, many of which still remain to testify to the greatness of the architects who practised at the beginning of the sixteenth century.

The first illustrated work on Classic architecture published in England was undoubtedly that of John Shute, who went to Italy in 1550, at the expense of Dudley, Duke of Northumberland, and on his return gave us "the first and chief grounds of architecture, printed by John Marshe, fol. 1563." Shute appears to have been a painter, and he was undoubtedly a clever figure draughtsman. We have recently given our readers fac-simile reproductions of two of his illustrations. Dallaway tells us he has failed to authenticate any of his buildings, but that he styled himself "paynter and architecte." He also published in 1562 "Two very notable commentaries, the one of the original of the Turkes, and the other of the warres of George Scanderbeg, translated from the Italian." 8vo., bl. letter; and Watts, in his "Bibliotheca," gives a list of many other of his works. His book on architecture went through several editions, one having appeared in 1579 and another in 1584. Shute was a native of Collumpton, Devon, and died Sept. 25th, 1563.

The next English writer who treated of the Five Orders seems to have been one Richard Haydocke, who, in 1598, published "A tracte containing the artes of curious paintings, carvings, and buildings, written first in Italian by Jo Paul Lomatius, painter, of Milan." On the singular title-page, engraved on copper, with portraits of the author and the translator, and a galaxy of gods and goddesses, we find that the work was "Englished by R. H., Student in Physik." The book, which is rare, is a small folio of 218 pp., printed at Oxford by Joseph Barnes. The author dates his preface from S. Marie Coll. (commonly called New Coll.) in Oxford. Though in the table of contents we have a list of the chapters of all the seven books of the work of Lomazzo, published at Milan in 1584, Haydocke here only translates five of them, but promises the other two in a subsequent work which, however, seems never to have appeared. The book is dedicated to Thomas Bodley, Esq., and is extremely interesting for the following reason—Lomazzo's work, with the exception of a wood-cut portrait, is not illustrated, but Haydocke gives us numerous copper-plate engravings in elucidation of the text, all of which it would seem from his preface were designed by himself. In a rather lengthy note appended to the third book, which he terms "A briefe censure of the booke of colours," we read concerning "limning where the colours are likewise mixed with gummes, but laide with a thicke body and substance wherein much arte and neatnesse is required. This was much used in former times in Church bookes, as is well knowne, as also in drawing by the life in small models dealt in also of late yeares by some of our countrymen as *Shute*, *Bettes*, &c., but brought to the rare perfection we now see by the most ingenious, painfull, and skilfull master, *Nicholas Hilliard*, and his well-profiting scholler, *Isaacke Oliver*."

In his first book of proportions Haydocke gives three plates of the Orders which, if we mistake not, are founded upon the illustrations in Shute's work. There is a fine copy of the "Tracte" in the art library of the South Kensington Museum. Gwilt, in his "Encyclopædia," asserts that "early in the reign of Elizabeth the treatises of Lomazzo and Philibert de Lorme were translated into English." We have seen that Lomazzo's work was first published in this country in the fortieth year of the reign of the Virgin Queen. The ten books of architecture of De Lorme were published at Paris in 1567, or rather in that year the first nine books were issued as "Le Premier Tome de l'Architecture," and a previous work published in 1561 is sometimes bound up with this volume to form the tenth book. The first work was termed "Nouvelles Inventions pour Bien Bastir et a Petit Fraiz." We can find no mention of an English translation of De Lorme's "Architecture," in Brunet, nor can we discover any record of it in the libraries of any of our public institutions; it is not included in the "Universal Catalogue of Books on Art." De Lorme's "Nouvelles Inventions" is in two books, and is curious as giving a mode of constructing timber trusses for domes and cupolas with short pieces of wood in two thicknesses, each length breaking joint in the centre of the one with which it is connected.

The writings of Serlio, concerning the date of the first edition of which there appears to be still considerable doubt, were the earliest, we think, to appear in England as a complete and connected work on architecture. Sebastian Serlio, it will be remembered, was a Bolognese architect who came to France about the middle of the sixteenth century (about 1540), and was appointed architect of the Palace of Fontainebleau. While in France he published his first and second books on architecture, in 1545. His third and fourth books had been previously published in Venice between the years 1537 and 1540. He seems while in France, after the death of Francis I., to have fallen into straitened circumstances, and to have sold his wood blocks and some of his manuscripts—the latter to Strada. A painter of Antwerp, named P. Cocke Van Aelst, was in possession of the blocks of the fourth book prior to 1542, and the rest of the blocks about 1545. The first five books complete, translated into Dutch, were published in one volume at Antwerp in 1553. No bibliographic research could, we think, be more interesting than to trace these woodcuts of Serlio's through their subsequent wanderings. In 1606 a second edition of the five books, with the same blocks, appeared at Amsterdam, in Dutch. In 1609 we find the identical wood blocks in the hands of a printer of Basle, who gave us a German version of the five books. Then we come to 1611, when Robert Peake having acquired the much-travelled and now almost worn-out blocks, published the first English edition, printed in London by Simon Stafford. Serlio, it will be remembered, in his Italian wanderings, and chiefly during his stay in Rome, measured many ancient buildings, and rude illustrations of these remains, drawn to scale, are contained in his third book. We cannot trace any subsequent edition of Serlio's "Architecture" in this country, and with the English edition of 1611 we may likely see the last of the wood blocks. Serlio's works, though at the time of their first appearance they attained immense popularity, and went through numerous editions, have not attained the same amount of recognition in more recent times as those of Vignola and Palladio. Perrault and A. de Pompei both give us comparisons of the proportions adopted by him in their useful "Parallels of the Five Orders."

As Peake's work is one of considerable rarity it may be interesting to give a brief description of it. He most likely used the second Dutch edition of 1606, or he may have received the wood blocks from the Basle printer, and have employed the German text of 1609. He tells us on the title-page—a separate one of which, in accordance with the previous versions, appears to each book, which latter, moreover, are so paged as to be complete each one in itself—that the work was "translated out of Italian into Dutch and out of Dutch into English;" but at the time he wrote Dutch may, we think, have been used to denote the German language—"High Dutch" and "Low Dutch" being the only distinguishing marks of the two languages. When was the German language first so called in England? Peake addresses his dedication "To The High and Mightie Prince Henry, Prince of Wales." The dedication is followed by a short preface appealing "to the Louers of Architecture," and then comes the first book with 15 folios; the second with 27; the third with 74; the fourth with 72, and the "fift" with 16 folios, the quaintly bordered title being included in each case.

The five books which appear in so many versions do not represent the whole of the labours of Serlio, and as almost every account of his writings we have yet seen is incorrect in one or other of the particulars, and as there are many inaccuracies in even the latest authority upon the subject, the "Universal Catalogue," before alluded to, we will endeavour to give a correct list of the works of Serlio, and reserve our remaining remarks with reference to certain other writers upon the Five Orders for another article. We have compiled our information from the excellent article in the "Biographie Universelle," the catalogue of Count Cigonara, who had a splendid collection of the works of Serlio, and the "Universal Catalogue of Books on Art":—

I. "Regole Generale di Architettura" (the 4th book), fol., Venice, 1537; 2nd, 1539; 3rd, 1540; 4th, 1544; 5th, 1551; 6th, 1559; German version, fol., Antwerp, 1542; French version, fol., Antwerp, 1542; 2nd, 1545; Dutch version, fol., Antwerp, 1549; Spanish version, fol., Toledo, 1563.

II. "Il Terzo Libro nel quale si fugurane e descrivone le Artichieta di Roma," fol., Venice, 1540, 1544, 1551, 1562; Dutch, fol., Antwerp, 1546; French, fol., Paris, 1545. Spanish, fol., Toledo, 1563. (In one vol. with book 4, by F. de Villalpando.)

III. "Il Primo e il Secondo Libro." French and Italian, fol., Paris, 1545; 2nd, 1547; 3rd, 1550; 4th, 1490; Italian only, fol., Venice, 1551, 1560; Dutch, fol., Antwerp, 1546; French only, fol., Antwerp, 1545, 1547, 1550. (Note.—We believe the 1547 and 1550 editions, both of Paris, by J. Barbe, and of Antwerp, contained all the five books.)

IV. "Il Quinto Libro de Templi," fol., Paris, 1547; fol., Venice, 1551, 1559. Dutch, fol., Antwerp, 1553.

The above five books were bound together as the "Architecture of Serlio." Fol., Fr. and Ital., Paris, 1550; Dutch fol., Antwerp, by P. Cocke, 1553; ditto, fol., Amsterdam,

1606; German, fol., Basle, by L. Koenig, 1609; English, fol., London, by R. Peake, 1611. The same wood blocks were used in all these editions.

V. "Libro Extraordinario di Architettura," fol., Lyons, 1551, 1558, 1560; fol., Venice, 1557, 1558, 1560, 1567.

The above work was not intended to form part of his treatise on architecture; hence the title.

VI. "Opere di Architettura libri sei." 4to., Venice, 1566, 1572. Translated into Latin by Saraceno, fol., Venice, 1569.

VII. "Il Settimo Libro di Architettura," fol., Frankfort, 1575, with a Latin translation.

VIII. "Tutte l'Opere d'Architettura et Prospettiva." 4to., Venice, 1584, 1600, 1619; fol., Venice, 1663, with a Latin translation; 4to., Vicenza, no date; also 1619.

The last is the only complete edition of the author, and the folio of 1663 appears to be the last date of publication (see Perrault, Pompei, and Le Blond). Many of the single books published at various dates are often bound together to form entire sets of the work, and this has given rise to much confusion and doubt respecting the different editions. The above dates are believed to include all the issues of Serlio's works.

ARCHITECT OR SURVEYOR?

THE discussion of a question of some importance to the younger members of the profession was opened by Mr. Alexander Payne last Friday evening at the Architectural Association, a full report of which will be found on another page. Whatever may be thought of a discussion upon a subject so often made the theme of animated controversy in the profession as that respecting architects and quantities, it cannot be disputed that the subject is one of perennial interest, that it is continually cropping up as one of the *vexatæ questiones* of architectural practice, and that it is one, moreover, which demands settlement before any one can complacently style himself "architect" upon his door-plate. In the provinces, it is true, the idea of an architect taking out his own quantities has never been challenged—at least, in the ordinary run of offices—but in London the question has been fraught with difficulties which the old bye-laws and regulations of the Institute have much tended to aggravate. Mr. Payne, in opening the discussion, plainly put the question from one stand-point, maintaining the view that the architect is justified in taking out his own quantities for buildings under his care; that the practice of analysing and resolving the parts of a building into its constituent elements is both desirable and necessary to enable the architect to write out his own specifications, and beneficial as a mental discipline, and further that such a practice as the dissection of the building insures him against looseness of detail. These in brief were the main arguments advanced by Mr. Payne, and, as far as they go, they are unanswerable from this side of the case; but, as Mr. Roger Smith afterwards hinted, there was an important distinction to be made, or another point of view from which the whole question had to be looked at. If we may be permitted to put it in another form, it is simply this: whether the architect is to be regarded chiefly as the artist and conceiver of the design in all that relates to its completion as a building, or whether he is to become the responsible contractor to his client to carry out a certain design for so much money? In other words, as Mr. Roger Smith said, the drawings and specification of a building represent it as a whole, while the "quantities" represent the amounts of stone, brick, timber, and labour expended upon it. The employer wants a complete building only; he looks to his architect for the result, not the means. It may be true the quantities form the means and become the instrument of carrying out the architect's intention, but we cannot see why the designer's labour should be extended so as to include the builder's. It is clearly exceeding the rational limits of the architect's duty, and committing him to figures and quantities that may seriously compromise his work as an independent professional arbiter between the contracting parties. If he undertakes to furnish the quantities of material and labour, he really becomes the responsible contractor, under whom the building contractor possesses only a secondary responsibility of pricing out the document. One of the strongest reasons urged to justify the quantity-taking architect was that the architect knows best the wants of his client, and can, therefore, be better entrusted with the preparation of the document. This is true, but his duty here is fulfilled in the specification upon which the bill of quantities is, and must be, solely based. We at once acknowledge Mr. Payne's contention that the preparation of the latter fortifies the architect, and induces a more careful, precise, and practical regard to detail—it makes him, in fact, a man of business. No one can doubt the force of this assertion who has ever prepared a set of quantities for his own buildings, and we think every young architect should sufficiently become master of detail and measurement to be competent to prepare his own, or to check those of a surveyor employed by him. The ability to prepare such a document should be a qualification, most certainly, in any future course of professional education: it should be as necessary as the rules of arithmetic and mensuration themselves; and the method of dissecting the amount of cube stone in a cornice or traceried window, and the various kinds of labour upon its different surfaces, or the quantity of cube fir in a roof truss, and the analysis of the different timbers composing it, ought to present no more difficulty to the architect than any of the simple rules of mathematics. But here the use of quantities to the architect should end. If he is able to design his work with a knowledge of the methods of measurement and valuation adopted by the surveyor, and is sufficiently acquainted with the *modus operandi* of quantity-taking to enable him to detect a discrepancy or to ascertain the accuracy of a bill, his duty to his client is satisfied. Mr. Watson's proposal of making the "quantities" part of contract, with the knowledge of client, would of course get over the greatest difficulty to the architect preparing them, the payments for them being clearly defined and made by the employer; but if we go so far as to make a general rule as to the former which is now universally admitted by the profession, it is a question whether we should not restrict the architect's work, limiting it to its proper functions, and be doing what is the present obvious tendency of the profession towards the division of labour—namely, the employment of a class of surveyors who devote themselves exclusively to quantities and building surveying. Mr. Smith observed that the quantities might be in the architect's hands, but that an independent surveyor should take them out.

We are led at this point to another consideration, and that is whether quantities should become a recognised document in the contract or not? The general opinion in the profession is that they should become a part of the contract, and be prepared with the concurrence of the employé. There is a very natural objection on the part of a client under the present system to pay for a document of which he is in total ignorance. A client engages an architect to prepare designs and drawings, and supervise his building, but he does not for a moment imagine that another 2½ per cent. comes out of his pocket for the preparation of the items or the document on which the builder bases his contract tender. As it often happens the tenders are above the employer's means, and he abandons his intention of building. Under these circumstances a very frequent difficulty occurs: the client refuses to pay for the quantities, and, under the existing state of things, we do not see that he is fairly compelled to pay (although in law the liability is admitted), as not being informed of their necessity he cannot be supposed to make himself liable for what he did not know. Now, as the "bill of quantities" is allowed to be a very necessary means of estimating the cost of a building, there appears to be only one alternative open—namely, that it should become a part of the contract, and the next question is by whom should it be prepared. There are many reasons which may be urged in support of the idea that it should be prepared by the parties willing to contract, especially as it is a part of the tender. As, however, the architect knows the requirements of his design the best, the selection of a surveyor may be fairly left to him, for we cannot see in what way any collusion or fraudulent connivance can take place between the architect and surveyor, their interests not being identical, and the "bill," being a recognised document, appended to the contract. Of course, such a thing as a secret commission or douceur for introducing the work to the surveyor should be strictly prohibited—the contract drawings and specification being simply placed in the hands of the surveyor, and his commission being paid, as now, by the successful contractor. As Mr. Roger Smith said, it was a most undesirable transaction for an architect to receive payment from the builder, and this is unquestionably the strongest reason to be urged against taking out his own quantities. It is impossible for him to bring an unbiassed mind to bear upon his work if as architect he has any connection of this sort, and there is finally the objection that the artistic instinct is antagonistic to so laborious and uncongenial a work. If we regard the large class of architects and engineers that hold corporation and sanitary appointments, the objections we have named in respect of private professional practices are even more intensified, as the fact of receiving a percentage from contractors in large undertakings—such as roadmaking and sewerage—necessarily places the adviser of the corporation in a delicate and often difficult position from which he should entirely be free.

REVIVED GUILD ACTION AND THE COMPANY OF PLUMBERS.

IT is not, perhaps, uninteresting to remark how professional or trade guilds descend from their original and avowed purpose. It is certainly instructive to notice the readiness with which individuals of easily-earned position and name enrol themselves as members of them, and eagerly seek for their distinctions. We need only to look at the original intention of founders of our professional institutions and trade guilds or companies, and the position they occupy now, to perceive the great falling-off from their original purpose. We have a pamphlet before us entitled, "Revived Guild Action," containing some suggestions to the wardens and court of assistants of the Worshipful Company of Plumbers, by the Worshipful Master, Mr. George Shaw, in which the writer ably contends for a revival of the excellent rules and objects of ancient guilds. As Mr. Shaw reminds us, the trade guilds of London were originally established to *organise* industry—to provide for

excellence of craftsmanship as well as to unite the workers in each craft in a fraternity. They, in truth, performed the work of trade-unions and benefit societies of our day, but upon a sounder basis of co-operation. Masters and employés—workmen of every grade—were united into one common federation, without the disturbing interests which now distract capitalist and workman. But the system of training or apprenticeship was upon a very different footing from that of the present day. Experience and knowledge were handed down from master to pupil: each guild provided the soundest procurable instruction, and the workman was not, as at present, left to his own resources and single-handed endeavours, but became one of a fraternity which held out to him the right hand of fellowship. Mr. Shaw admits that during the last hundred years the old guilds have been "falling to pieces," and are being replaced by minor organisations. He attributes this chiefly to the division of labour and the increase of our working population, whereby it is enabled to become independent and self-supporting. Apprenticeship, as the author very justly remarks, has either entirely disappeared or nearly so. We may instance this result in nearly all modern building trades, and it is a cause of much of the decay of interest and decline of skill displayed in modern workmanship. It is true we have in our larger establishments some approach to the corporate principle of the ancient trade guilds—that is to say, the members of the establishment are benefitted under the management of the employer; and in some cases the workmen share in the profits and belong to a mutual benefit club, but we do not think this principle has taken root so well as the author imagines, much of the difficulty arising from the antagonistic interests of employers and workmen.

Now the trade-unions, against which so many raise objections, are in reality in part the revival of the benefits conferred by the old guilds. They have secured to the less fortunate members of a craft many advantages—such as a fund for relief in time of sickness or old age, and independence of action; but, as the author remarks, they as yet have made no provision for efficiency on the part of the workman. Undoubtedly this is the one weak point of trade-unionism, and until the working classes begin to realise the importance of making themselves proficient the modern slop-shop workmanship of which we have so often complained will remain the blot of modern industry and the handle for all kinds of complaints. Mr. Shaw, while thinking the system of restricting the number of entrants adopted by the unions, so as to limit competition, is desirable, yet very justly observes that the limitation is intended by the men to keep down the supply of skilled labour in their particular trade, and the whole craft is not benefitted as under the old apprentice system. These are some of the arguments the writer uses to show the necessity that is arising to supply defects in the present system, and to revive, as far as the Plumbers' Company is concerned, the ancient principle of training craftsmen for their work: thus to maintain a supply of skilled labour equal to the scientific progress and wants of the time. By the men, as well as by the masters, such an improvement is loudly called for, and in the building trades we certainly think the future of art-workmanship depends on the issue. Of course, the author urges this reform in the interests of the plumbers. The writer says "the Plumbers' Company is under a responsibility to the public—to society at large—which can hardly be exaggerated. Much the greater part of the 'economy' of a household depends upon the plumbers. It is upon them, far more than upon any other trade, that the public are dependent for comfort and health in their households—in other words, for probably at least twenty out of every twenty-four hours of their life. It is we who have to do the work of supply in houses for water, and also for the drainage or sewerage by which the waste and offensive materials of household life are got rid of." Entering into these arrangements seriatim the author shows how much of our comfort depends on good plumbery, such as water supply, good joints, weather-tight roofing, the position of cisterns—about which we have the very salutary recommendation that will come home to many householders just now, that cisterns should be kept away from the body of the house, in some outlying part, to lessen risk of overflow and damage. As to drainage, Mr. Shaw tells us nothing of which our readers are ignorant, though we rather join issue with him when he says "it is to the plumbers that the public now look for measures to remedy" the evils of bad house drainage. We do not think so. Indeed, it seems to us the plumbers have had their way too long with solder, and air-tight pipes, and connections, and if we had followed them there would have been no such an idea as a ventilating cesspool or a disconnection of house drains. For a long time they opposed such an improvement to a man, and many are still prejudiced against the cleaner fittings of earthenware, iron, and slate. But as the shoemaker swears by his leather, so does the plumber by his lead; and, as Herbert Spencer says, every class has its bias. However, we are glad to find the Master of the Plumbers' Company advocating wholesome doctrines and assisting to exterminate old ones among his craft—such as the abolition of common traps, the urgency of the removal of all closets, bath-rooms, and sinks as far as possible from living and sleeping rooms, and the use of air-pipes to house drains. Coming to the remedies, Mr. Shaw suggests either a prize or money gift to youths who are willing to become apprentices, or offering the membership of the company as a premium and diploma to craftsmen who are worthy of it, with the attendant pensions or gratuities which the company can confer in cases of sickness or old age. Such a course of action would be an incentive to good workmanship and character. As to the mode of accomplishing this the author proposes an examination of the candidate before the master or a committee—of course having reference mainly to previous employment by a member or employer of character and position; the application for membership to be endorsed by the employer under whom the workman has served for a given number of years. The certificate of efficiency thus obtained would be a passport to employment. We heartily commend the scheme proposed by Mr. Shaw to the attention of his company—a guild which dates from the time of Edward III., and which is the only organised society for the craft in England. In laying before our readers the scheme our great desire is that other of the City guilds may follow the example, and that carpenters, plasterers, and the many other craftsmen engaged in the great industry of building may not lose the opportunity of organising like benefits in their respective societies or trade-unions. The labour market is overburdened with hands just now, but how many skilled and conscientious workers are there?

THE ANCIENT EGYPTIANS.*

AMONG the few archæological works which have exercised their influence down to our own times, that of Sir John Gardner Wilkinson on the "Manners and Customs of the Ancient Egyptians" occupies an important place. Sir Gardner Wilkinson was a born archæologist. While a boy we find he had a strong inclination to travel and to see foreign countries, and he entered the navy with this object in view. Early in life he showed a decided taste for architecture, and made sketches of churches when at school at Harrow. While at Oxford he followed up the same taste in drawing objects in the Arundel Collection. According to good authority we find Sir Gardner early made the acquaintance of Sir W. Gell, a great archæological explorer, who persuaded him to enter into the survey and study of Egyptian remains. In 1821 he set out for that purpose and took up his abode at Cairo. Here he made himself familiar with the language, and began the work of exploration in Lower Nubia and other parts, including the Egyptian oases, and his first visit extended over a period of 12 years. His first work was "Materia Hieroglyphica," with plates. Other works followed as the result of his researches, and returning to England in 1833, on account of ill-health, he began his celebrated work, a new edition of which is now before us, the book having been first published in 1837. Since the publication of "The Manners and Customs of the Ancient Egyptians," the author made several other visits to Egypt, and the result of these discoveries, we presume, have been incorporated in the new edition. We open the new work, and find it has been edited and revised by that well-known and learned Egyptologist, Dr. Samuel Birch, of the British Museum, from whose preface we learn that the work has been extended, and corrected from the notes and manuscript which Sir Gardner Wilkinson left behind after his recent death in 1875. Little of the original text has been, however, altered or omitted, Dr. Birch's revision having been mainly confined to the correction or expurgation of such opinions and statements as the progress of discovery has rendered necessary in the work. The new views and facts, many of much interest and value, have been judiciously embodied in the form of notes, and here and there as interpolations in the text; but in all cases the initials of the present editor have been affixed to them, so that the reader is at no loss to discover what notes are due to the original author, or to Dr. Birch. Many of the corrections consist of alterations in the orthography of leading names, which the researches of modern Egyptologists have introduced. On this point Dr. Birch remarks: "The system of transliteration of Egyptian words and names is still in a transitional state, but in the interest of comparative philology and general science it is hoped that some final settlement, such as was proposed at the Congress of Orientalists, held in London in 1874, will soon be universally adopted. This system has been followed wherever the Egyptian words are cited in the native form, but not when they are mentioned by classical authors." The editor acknowledges his obligations to Lady Wilkinson for the notes left by the author, who continued his Egyptian studies to the last; to Mr. William Chappell for additions on Egyptian music; and to his son, Mr. Walter de Gray Birch for important literary assistance.

In the first volume, chapters V. and VI. possess most interest to the architectural student, though we are surprised to find so few additions. We do not know whether all Sir Gardner Wilkinson's more recent researches in this branch have been embodied. The elevation and plan given of an Egyptian house, from sculptures, afford us a rough idea of the larger kind of houses. They were quadrangular in plan, comprising an open area in the centre, and transversely to it ran an avenue lined by trees. The four angular covered spaces were occupied by rooms for stores on the ground floor. There

* The Manners and Customs of the Ancient Egyptians. By Sir J. Gardner Wilkinson, D.C.L., F.R.S., &c. A new edition, revised and corrected by Samuel Birch, LL.D., D.C.L., &c. London: John Murray.

was a portico or porch before the front-door (*janua*), supported on two columns, below the capitals of which were ribands or banners, the occupant's name being sometimes painted on the lintel or imposts. Occasionally there appears to have been a double row of columns, between which stood colossal statues of the king. Woodcuts of such porches from Thebes and Alabastron illustrate this. Houses of small size, often connected, lined the sides of streets; they rarely, says our author, exceeded two stories, many of them consisting only of a ground floor and an upper set of rooms. In some of these smaller plans the court "was an empty space larger than the Roman *impluvium*, probably paved with stone or containing a few trees, a small tank (or well) or a fountain in its centre, and sometimes, though rarely, a flight of steps led to the main entrance from without." The small plans furnished to illustrate houses of this sort show a variety of arrangements of the apartments. Some consist of a court and corridors, with a set of rooms on each side; others with the apartments arranged unsymmetrically along one side, or in the angle. The plan given of the ancient city near Tel-el-Amarna, called by the author Alabastron (but now considered to be Psinaula), affords a good idea of the streets and houses of an Egyptian city. Some of the remains show houses of only a court and three or four store-rooms on the ground floor, with a single chamber above, reached by a flight of steps from the court. There is a model in the British Museum of a small house of this kind. In the court a woman is represented making bread, and the store-rooms were full of grain when the model was found, but a rat in the lazaretto at Leghorn in one night, it is said, devoured the contents. "On entering the porch you passed into an open court *aula*, (or hall of the Romans), containing a *mandara*, or receiving room for guests." This is shown to be supported by columns decorated with banners, with an awning over it, closed only in the lower part. There was an interior door to this court, leading to the interior, through which the master passed to receive the visitor. An inner and larger avenue or court followed, quite open and lined with trees, and this inner court communicated right and left with the private apartments. There was a back entrance to this central court (posticum), and the chambers on each side were similar—six on each side—the doors of which faced each other along a transverse and narrower avenue, which, with the central court, divided the square area into four square divisions. These smaller avenues formed the entrances to each chamber, and were shaded with trees. At the end of one was a sitting-room, facing the doorway to the great court; over this and the other chambers were apartments, also of the upper story. In another instance we see a court or avenue (or *amma*), with trees on one side being a series of chambers, opening on corridors. A receiving-room forms a square compartment at entrance end of the main avenue, down which it looks, and this avenue is lined with columns, and led to a private and isolated sitting-room. It was probably one of these interiors Mr. Long selected in his celebrated picture in the Royal Academy, "An Egyptian Feast," and the convivialities of social life took place in these retreats, shaded from the sun's rays by awnings. The walls and columns were stuccoed and painted with devices, and many details of the doors and hinges are engraved, to which the student may turn with profit. Of vaults and arched roofs nothing new is added to the old edition, though Dr. Birch appends a note that the "stone vault has been found as early as the 6th dynasty." The arch in the tomb near the Pyramids is engraved, assigned to the 5th dynasty, and, as the author remarks, the paucity of wood in Egypt led to the invention of the arch, found in the tombs as early as the commencement of the 18th dynasty, or about 1540 B.C. Rooms were often arched, and the upper ones were frequently surmounted by the wooden *mulguf*, or wind-conductor, seen at Cairo. Patterns of the painted Egyptian ceilings are given on plate VIII., from a tomb at E'Sioot, in which many beautiful frets are seen, and other conventionalised forms, based on the lotus, the diamond, square, and circle. Before leaving this part of the work we may say numerous other allusions to shops, villas, farm-yards, gardens, orchards, and other accessories are to be found well illustrated from sculptures, and which furnish to the curious reader a good idea of the habits of life of the ancient Egyptians.

Chapter VI. treats on the furniture of Egyptian houses, and will be found of special interest, many new notes having been added. Many of the illustrations represent objects from Mr. Salt's collection and in the British Museum. Musical instruments—the various cymbals, trumpets, flutes, lyres, pipes, &c.—used in sacred and dance music form an important part of this chapter; and we find numerous critical notes have been interspersed relating to the names and terms. Volume II. opens with an account of vases, boxes, social gatherings, and various games, the perusal of which chapter will convince many of our own day that the ancient Egyptians were not so barbarous in their ideas and tastes as we are sometimes apt to imagine. Chapter IX., on "Arts and Manufacture," will be read with fresh interest, especially the allusion to obelisks and colossal statues. The Egyptians, like ourselves, in their temples, conformed strictly to ancient rules, and the ancient style was always looked upon with the highest veneration. Plato and Synesius both mention the stern command which forbade artists to introduce any innovations; hence the profession of artist was not allowed to be exercised by the illiterate. Dr. Birch remarks, "The earliest dated example of glass is a small fragment of dark blue glass, impressed with the prenomen of Antef III., of the eleventh dynasty." He also speaks of a toilet bottle, "in shape like a Greek *oinochoë*," of a turquoise colour, and having ornaments and a yellow-coloured inscription on the neck and body. The glass is semi-opaque, and ornamented with waving lines. Many of the bottles and vases are of unique form, and display a taste marked by much refinement. It is well known glass-staining was carried to perfection; the amethyst and other precious stones were imitated, and many of the colours found in opaque glass have baffled modern skill to produce. Dr. Birch, in speaking of earthenware, says, "The finest of all the products of the Egyptian potter were the vases, covered with a vitreous glaze produced for the toilet, of a blue, green, and other colours, consisting of small vases, with inscriptions and figures." The designs were hemispherical, lotus-shaped, drop-shaped, &c. The blue of the best age is unrivalled at the present day. The remarks on cabinet-making are of interest. We there learn of the habit of the ancient artists to paint on boards to imitate foreign woods, the colours being applied on a thin coating of stucco, laid smoothly upon the wood. The sculptures of Thebes inform us also of veneering, as of many other modern practices, many of the tools used bearing a remarkable similarity to our own. Of the long-debated use of iron among the Egyptians, Dr. Birch adds, "A thin fragment of wrought plate-iron was found in one of the air-passages of the Great Pyramid, and the iron blade of a falchion under a sphinx, at Karnak. Lately a broken statue of a bronze, from the neighbourhood of the Pyramids, and of the age of the Ramessids, has been found, with iron wires passed through the sand-core to sustain it in its oval place." Two words, Dr. Birch says, have been found "descriptive of iron—*bad en pe* ('heavenly metal'), supposed to be meteoric iron, and *ba nu ta*, or 'terrestrial metal'—that found on the earth." Another word has been supposed to mean steel, but it is doubtful.

The most interesting chapter to us is Chapter X., which treats of style of art—sculpture, drawing, painted architecture, &c.; but little has been added to the original text. Of course the restricted and conventional mode of drawing of the Egyptian artist—the formal attitudes of figures, and the lack of conception—are pretty well known by the numerous sculptured representations and paintings. Dr. Birch remarks on statues: "Groups were exceedingly rare, and seldom exceeded two figures; generally husband and wife, seated on the same seat or chair, holding one another's hands, or placing their arms round one another's waists." He also notices various peculiarities in seated and standing figures, such as the advanced left foot, &c. On painted architecture nothing new is added. Red, green, and blue were common colours, and these were mixed with water, and probably a little gum; but the most interesting part is the reference to the analysis of the colours made by Dr. Ure for Sir J. Wilkinson, from which it appears ochres and pulverulent glass, made by vitrifying oxides of copper and iron with sand and soda, and other earthy ingredients, form the chief part of those brought from Thebes. A plate of coloured capitals, in which green and red are the prevailing colours, gives a fair idea to the uninitiated reader. The remarks on architecture are scarcely equal, as we have said, to the scope and merits of the present edition; and we expected to find references to other and later contributions on the subject—notably, Mr. Ferguson's. Another work on the "Architecture of Ancient Egypt" was published by the author, however.

In a footnote appended to the remarks on the arch, Sir G. Wilkinson says, even in Roman times, when Egypt was in subjection, the preference for the arch "was not allowed to intrude into the sacred edifices; and prejudice forbade it even in the small out-of-the-way temples of the Oases, except in a position where it did not interfere with the character of the building." Various examples of the use of the arch are shown, as in a brick pyramid at Thebes; also an imitation, in which the blocks are laid horizontally, each projecting over the one below, dated about 1500 B.C. The moving of great weights is another point touched upon; and it is well known that the Egyptians not only understood mechanics, but also were advanced in hydrostatics. The syphon is shown to have been invented at least as early as 1450 B.C., as it is represented in paintings of that date. Dress and jewellery form another subject of some interest, to which space prevents our referring here.

The third volume is devoted entirely to the Egyptian Pantheon, and the peculiar attributes of the various deities, into which it will be useless here to enter. We observe a few notes and interpolations by the editor, which will render this portion of the work of greater value to the student. Of course there is much room left for uncertainty and conjecture respecting the names, origin, and attributes of the Egyptian gods. Thus the mythological history of Osiris is involved in great obscurity—his existence on earth was a pure allegory. The same may be said of Kneph or Chnoumis, the idea of the spirits of God, and of most of the other eight great divinities. A full description

of the sacred animals, and their rank—of processions, ceremonies and funeral rites (burial, embalming, and sarcophagi)—complete a work that has for forty years been a standard handbook upon the subject of Egyptian antiquities; and Dr. Birch's revision must be regarded as giving the original work of Sir Gardiner Wilkinson a fresh lease of public favour. A complete and copious index is appended, while the numberless engravings and plates increase the authoritative value of the work, and make it a most welcome addition to our literature.

ARCHITECTURAL ASSOCIATION.

THE fortnightly meeting of the Association was held on Friday evening, Mr. Aston Webb, vice-president, in the chair. The following new members were elected by show of hands:—Messrs. R. F. Davis, E. Early Hollis, F. Vanders, jun., A. H. Lowndes, Josiah Gunton, F. W. Clithero, C. F. Annesley Voysey, and P. B. F. Freeman.

ARCHITECT OR ARCHITECT AND SURVEYOR?

Mr. Page (hon. sec.) stated that several letters had been received with reference to this discussion, of which he would only read that from Mr. Honeyman, of Glasgow, who said:—"1st. I hope there is no need to put the word *versus* between the 'artist' and the 'practical man.' I flatter myself that I am both, and I hope most architects, with good reason, do the same. 2nd. An architect should certainly know how to take out quantities; but this knowledge will not cause him to be more particular with specifications and details if the quantities are to be the basis of the contract. Nor will it help him to avoid exceeding his estimates unless he has taken out the quantities himself. Should he take out the quantities? Certainly not, unless a radical change is made in the existing relations of the quantities and the contract. I believe such a change to be urgently required. If it were made, there would remain some, though no serious objections, to an architect taking out quantities for himself or for others. But of course, even in these circumstances, many who would not consider the practice wrong would deem it inexpedient—I may say that I am one of these—although our practice here in contracting is essentially different from that which prevails in England. I have never taken out quantities, and I invariably decline to undertake valuations, &c."

Mr. Alexander Payne opened the discussion by a short paper. The feud between the "artist" and "practical man" was almost as bitter as the battle of the styles. A would say of B, "He may be a very good man at shop fronts, or roads, or quantities, but he is in no sense an artist;" while B of A would remark, "He draws very pretty pictures, but his plans and construction are wasteful—he is not a man of business, and lets his client in for all kinds of extras." Which of these two was right, and towards what branch of the profession should the student chiefly direct his studies? Should the man who meant to practise as an architect learn also the business of an "architectural surveyor," and was it admissible for the young architect to take out his own quantities? To this last point he would specially devote himself in opening the discussion. He held that the practical knowledge required and careful dissection of a building made by a surveyor in preparing quantities, analysing each detail of a design with its constituent parts, and ascertaining the amount of labour and material in each, was more necessary to the architect who wished to have a thorough grasp of his subject than was a knowledge of anatomy to a figure-painter; that it was highly advisable for him not only to be able to take out quantities but also to join the profession of quantity surveyor to that of architect; and that it would be very much to his clients' interest as well as to his own for him to take out the quantities of his own building. Further, an architect at the commencement of his career was hardly fit to look after his clients' interests and make the best use of the materials at his disposal, or even to write the specification properly, unless he possessed the knowledge proper to the quantity surveyor. In a design prepared by an architect who had not had much experience, and who knew nothing about quantities, there was generally a vagueness about the whole thing, especially in the details, and materials might be put together in a way that could not be adopted by the builder. There would be a worse looseness about the specification—roofs to be properly constructed, stonework to be properly put together, joiners' fittings to be properly made. The whole specification might be summed up as "Do everything properly"—a direction very proper, but not very explicit. When the quantity surveyor had dealt with such a specification it would generally turn out that though the main outlines of the design might be the architect's, as represented by the general drawings, the way in which the work was carried out was dictated by the quantity survey as represented by the quantity surveyor. But as that document only gave results, and the quantity of work in the whole building, and not the amount in each detail—information contained in the dimensions usually left at the surveyor's office—the builder again was left to his resources as to the manner of carrying out the work properly. The builder's resources were wonderful, but chiefly lay in the direction of omitting and cutting down, so that the work, as carried out, was different again from the intentions of the quantity surveyor, and the client was a loser. Then came the reckoning day. Doubtless there had been various alterations rendered necessary, or desired by the client during the progress of the works, and the architect, ignorant of quantities, would be unable to see with precision how these affected the rest of the work, either as extras or deductions. The builder, whose propensities seemed before to lie chiefly in the cutting-down line, now developed amazing abilities in putting-on. He had lost tremendously by the job; this alteration stopped all his men, and put him to much expense; that extra was a very serious consideration, whereas any deductions brought forward were mere trifles, and ought not to be mentioned; or perhaps he thought the only way for him to be properly paid was to set aside the contract, and make an enormous bill for time and materials. He was in this supposing the worst case, for the architect should, like a good general, hope for the best, but be prepared for the worst. When an architect worked independently of the quantities, it might be exceedingly difficult to prevent the client from being saddled with a large amount of extras, priced on a very different scale to the original contract. But supposing the architect to have himself taken out the quantities. The general drawings would be prepared, and probably the details and specification only partly when the quantities were begun. As each part of the work was taken out in the quantities, the details, and part of the specification referring to it, would probably be finished in exact accordance with it, and the careful dissection necessitated by taking out the quantities would suggest many ways in which the details could be carried out better or more economically than at first intended. When all was finished the drawings, specifications, and quantities would agree, and each and all would explicitly show the way in which the work is to be carried out in detail. As the works proceeded, if any extras or deductions were required, the architect had the dimensions at hand, and could at once see how this or that detail was affected by the alteration, and adjust the difference upon contract prices. Such an arrangement was the fairest for all parties, and only disappointing to a contractor who entered upon work with the intention of making his profits not out of the contract itself, but out of the extras it might carry in its train. He should like to know whether, when the architect acted as his own quantity surveyor, the quantities themselves might not be made the basis of the agreement and contract—that was to say, the builder contracted to do the amount of work in the quantities for so much, any more to be added or any less to be deducted at contract prices, a schedule of which was given. Against this it was argued first, that a client would never know what he was going to pay for the work on account of possible errors in the quantities; and, secondly, that by this plan a quantity surveyor would be shirking the responsibility which ought to rest with him to supply a correct bill of quantities. In reply to this he asked, first, did a client, under the system commonly adopted, always know what he was going to pay for the work; and, secondly, did the responsibility towards the builder, always hanging over the quantity surveyor's head, act detrimentally or not towards the client's interest? Did not the fact that the quantity surveyor was paid by the builder, and was responsible to the builder, naturally tend to make him favour the builder? There were many anecdotes which occurred to the speaker indicating that this was the case. He had heard of a contractor calling on a surveyor and pointing out to him a clerical error in the quantities, and demanding reparation—on which the surveyor said "Then it will be my duty to go through the whole work as executed, and see how it agrees with the quantities," on which the contractor took up his hat and beat a quick retreat. He suggested it would be a fair arrangement if clients were themselves to pay the quantity surveyor, and if the quantities were made the basis of the contract. There would be no inducement then to make the quantities anything but an exact, close, and accurate statement of the work to be done without fear or favour to any one. It would tend, too, to remove a certain underhand look about the payment for quantities that now existed. In many cases the client believed that the fees he paid to the architect cover all the professional charges in connection with the work—he paid the builder for the quantities without knowing it, and the builder passed on the money to the quantity surveyor. If it came to the client's knowledge that he had paid the extra amount for the quantities, he very probably looked upon it as an imposition, and he sometimes positively claimed the amount back from the architect. How much better would it be for all if it were openly recognised that the bill of quantities was a necessity as much for the client's interest as anybody's, and to be paid for directly and openly. It was impossible to have things in a responsible profession done too openly and above board. Another important argument in favour of uniting the professions of architect and surveyor was, that by such an arrangement there was less danger of an architect exceeding his estimates. This discussion naturally suggested the further questions: Should an architect confine himself to designing and carrying out buildings and works of a decorative character, or should he undertake valuations, estimate of dilapidations, land surveys, general superintendence of building estimates, and the like? A generation ago these would have been all undertaken by an architect, and most practitioners in the country would now accept work of this class, but in town the division of labour in our profession was on the increase, and some architects not only avoided this class of work but confined their attention principally to one particular class of building. Probably this division of labour might often lead to the accomplishment of better work, but he thought it would not be wise for a younger member of the profession to neglect any branch for the obvious reason that he might not find, when commencing business, a large amount of work going on of the particular sort he preferred. Though certainly one who could afford to wait and was determined to devote himself to architecture proper was much to be approved; but even he was not exonerated from the many practical studies relating to architecture, and especially from studying quantities. If he educated himself in the fine-art branches alone, for instance at the commencement of his career, he might eventually find himself a draughtsman of pretty pictures, but not an architect. Mr. Payne said he could not forbear making a few remarks in favour of devoting more time to practical studies. For one who made a name by successful competitions, twenty perhaps equally clever but not quite so lucky, were nearly ruined by them. It was better and more likely to lead to lasting practice to patiently and laboriously carry out a small unpretending job, without much architectural pretensions, if the best was made of the client's money, and all was well done, than to win a competition in

which the showy drawings had to be cut down and pared to something very different to what the coloured perspective portrayed. Why was it that one might pass through suburb after suburb of this metropolis with row after row of residences, and other buildings of considerable magnitude, in which the hand of the architect was conspicuous by its absence? Why, was it that the sanitary engineer and ventilating doctor to say nothing of the zinc chimney-pot man, were not unfrequently called in to remedy the work of the architect? Why was it that there was an idea abroad amongst the public that the architect was a kind of expensive luxury, well enough for *dilettanti*, and those who had plenty of money to spend in ornamentation, but who could be very well done without in ordinary practical buildings? Was it not because architects were much in the habit of thinking too seclusively about the appearance of their buildings, and not sufficiently at them from a client's standpoint.

Mr. T. Roger Smith thought there was a danger of looking at quantities from a wrong point of view. Quantities and drawings and specifications were two different steps towards the erection of a building. The drawings relate to it as a whole as it would be; the bill of quantities to the stone, brick, wood, iron, and other materials, and the labour that would have to be expended in fitting the building for use. In such a discussion there was much danger of supposing that these were the same things. It was not the wish of the client to obtain so many bricks, stones, and pieces of timber, but to get a complete building; and the architect's aim should be so to prepare his drawings as to obtain that for a definite sum. The bill of quantities was a document framed for the guidance of the builder in the transactions which were to result in the erection of the building. In the present day this bill of quantities was an indispensable article. Tenders could not be obtained—at any rate from the larger firms of builders—without it. Looking at the matter thus broadly, he thought this bill of quantities should in some shape or other be in the architect's hands. It was not necessary that the architect should take it out, but that he should be able to do so, although an equal amount of practical knowledge was needed in making a set of working drawings. There were several reasons, however, against an architect taking out his own bill of quantities. First of all, it could only be paid for by the builder—in 19 out of 20 cases it was made for his sole use. If application were made to the employer for payment for the quantities, strenuous opposition would be raised, and it would be practically impossible for the quantity surveyor to obtain payment from the client. Ultimately, therefore, the builder must be looked to for payment. Then it was most undesirable, from many points of view, that the architect should receive money from the builder. He ought to be thoroughly independent. He had to supervise the work, and stand as umpire between client and builder, and the fact that a sum of money was owing him by the latter would be to a needy man very unpleasant. Another objection was, that the young architect would hardly bring an unbiassed mind to the preparation of his own quantities. He was generally in love with his own design, and thought that he would carry it out more cheaply than anybody else. It was, therefore, well for him that others should have the opportunity of going over the work and considering whether this wall should not be thickened and that floor strengthened. Further, it was a pity that men capable of highly-artistic work should occupy their time with mere clerkly work. On the other hand, the more closely the architect kept control over the taking out of quantities the better would it be for the general outcome of his labour. It was undesirable to turn over the whole of the drawings and specifications to the quantity surveyor, and to leave all else to him. The architect should know all steps taken, and have any difficulty explained by or to him. He considered, however, that the objections against an architect taking out his own quantities were —in London at least—stronger than the very cogent reasons that could be advanced on the other side.

Mr. Watson thought some of the last speaker's arguments were answered by others that he had mentioned. Mr. Smith admitted there were certain circumstances under which an architect might take out quantities, and he would state some of those "certain circumstances." No work could be undertaken by one man for another without incurring responsibilities, and who ought to bear that of the correctness of the quantities supplied to the builder more justly than the architect? It might be said that a special contract would arrange everything, but if the architect was his own quantity surveyor this would be unnecessary. They had been told that if the architect received money from the builder he could not be "independent," but there were few men who were absolutely "independent." When two men, however, agreed to appoint a third as arbitrator they entered into an agreement, erecting that third party into an independent judge on all matters in dispute, and the same could be applied to the architect as arbitrator between client and contractor. If this were not so what was the meaning of the common clause in contracts—"All matters of dispute shall be determined upon by the architect, whose decision shall be final?" Again, it would be admitted that he who paid was the employer and he who received the servant. Now, the client knew that ultimately he paid for everything—not only the builder, but also the architect and the quantity surveyor. The quantities should be recognised and paid for by the client direct. The system of payment through the builder, by an addition to the contract, was highly objectionable. If a capable designer ought to show all masses, thicknesses, and details, it was only going a step further for him to take out his quantities. When an architect did this he often for the first time found difficulties arise, and was compelled to make his drawings more definite. When they were prepared in a separate office there were three persons playing at French blind-man's buff—the architect, the builder, and the quantity surveyor—and the mutual difficulties were much increased by the triangular forces of separate interests concerned. The quantities should be made a part of the contract, and it was most important for the architect, before taking them out, to obtain the distinct concurrence of his client. Where this was done he could conceive of no objections to the practice. It might be said that money should not pass from the builder to the architect, but the former, as a man of business, must know that the money no more belonged to him than that which he paid his timber merchant. Builders were always pleased to find bills of quantities prepared, and he did not see that the client ought to feel any objection to their being prepared by the architect.

Mr. W. Hilton Nash looked upon quantities as a necessary evil, as they generally increased the cost of building. The quantity surveyor stood in a very peculiar position both to the architect and the builder, and as he was paid by the latter he had a tendency to serve him rather than the architect, for if any mistake occurred to the disadvantage of the builder, the quantity surveyor was looked to to make it good. He differed from Mr. Watson as to the disposition of builders in regard to bills of quantities; they objected to allowing them to become parts of the contract, as they were then tied down in three different ways—by the drawings, specifications, and quantities. An architect ought to be both architect and surveyor, as an artistic and practical man. A man might very well combine the two, but if he took out quantities there was a danger that the occupation might unfit him for more artistic work. He could not agree with previous speakers that the taking out of quantities would render a man more careful in his drawings and specifications, nor less likely to exceed his estimates.

Mr. Cooper asked why should not an architect make use of his power as a surveyor when occasion offered. The practical knowledge of quantities was directly necessary to enable him to estimate: the knowledge of prices would check him in designing, suggesting what was, and what was not, expensive work. He could see little objection to his taking out his own quantities if he was not paid by the builder. To the professional man architecture should be the mistress to whom he should be devoted, and surveying a servant whom he could usefully employ. Even admitting that an architect declined to take out his own quantities, why should he not do so for others if he had the time and knowledge? In these hard times of competition many found it impossible to maintain their ground by one branch of the profession, and they ought, therefore, to be allowed to style themselves architects and surveyors.

Mr. Cole A. Adams suggested that the subject for discussion might have been more correctly entitled, "Artist *v.* Practical Man." The chief question seemed to be whether an "architect" should take out or know how to take out his own quantities. An artist would not want to know about quantities, but a practical man—and an architect who was not practical or striving to become so was an impostor—would say that to know how to take out quantities, even if he did not approve of supplying them to builders for tendering upon, was most useful knowledge to possess. It taught habits of method, care, and precision, making the architect familiar with every part of his work in hand, checking his drawings and specifications, showing him where a saving could be made, correcting his fancies by facts, adding to his practical store, in many ways familiarising him with measurements and prices so that he could readily discern what materials could be economically used and what dispensed with. It was sometimes assumed that if an architect took out his quantities his specifications and details would be more carefully worked out, but this did not necessarily follow. In the office of one celebrated architect who follows the ordinary London practice, every part down to the key-holes on the doors, were particularly delineated. Details, whether with or without quantities, to be of any use must be full. In the Conference of Architects of 1874 a further knotty point—might not the quantities be made the basis of the contract?—was discussed and shelved. A committee had been appointed to report on the question, and they suggested that it would be advisable to incorporate the quantities. It was stated by Mr. Cates that out of over 60 replies to this question some 50 were in the affirmative. But the report so alarmed the Institute council that they passed a resolution against its adoption. It was said then, and had since been repeated, that if the practice were adopted, that honourable body of men, the quantity surveyors, would cease to exist; but if it could be shown that employers were better served by architects taking out their own quantities, the argument was weak. He did not believe this would be the result, and in any case vested interests must give way to the wants of mankind. He thought quantities might fairly be made a part of the contract if an arbitration clause were inserted in it. The employer should be made aware of the intention, his consent be obtained, and payment for the service made direct to the architect. There was no doubt that an architect who understood quantities was less likely to exceed his estimates. Should an architect, if qualified, undertake valuations, dilapidations, land surveys, and general superintendence of building estates? He would reply to this by asking whether any one was better fitted for this class of work than men educated in the theoretical and practical art of building? He would leave to others the claims for a hearing of the artist. Should practical architects leave this most profitable part of their work to lawyers, auctioneers, and estate agents? In conclusion, he protested against the suggested line, "The Artist *v.* the Practical Man." Art, artist, artistic are becoming, said the speaker, words that stick in one's throat. We have art wall-papers, art blues, greens, and browns, artist-architects, and the like, artistic furniture and drawings—a host of other things, with one or other of these prefixes. These are the outcome of imitations, shams, sentimentalism, and cant—the offspring of misrepresentation and lies. Why are not men satisfied with the words "architect," "surveyor?" There is work enough for all head and hand workers who care to do it, and there should be no feeling in the profession but one of mutual support. As a young man speaking to young men I would beg you to bear in mind that

whatever you undertake, be it that highest form of work—a temple to the glory of God, or the general superintendence of a building estate—that you are nothing unless practical. Do not think anything likely to add to your store of knowledge derogatory to your artistic instincts. The quality of draughtsmanship has of late advanced with rapid strides, but this alone will not produce satisfactory work. You must cultivate the sciences also, and make yourself acquainted with your profession from foundations to topmost stone. Be not satisfied with indefinite work; leave arrangements, harmonies, and symphonies to those who like and understand them. Their motto is nocturn. Dabble not in work on such a basis, or you may find one day that your employer will claim damages from you, which a farthing will go but a short way to meet.

Mr. Robert Walker regarded the question as an essentially practical one. The quantity surveyor had been spoken as a modern innovation, but Shakespeare had referred to those we call "surveyors" in a manner suggesting the same kind of work. The references to the taking out of quantities as a means of education to the young architect he regarded as rather unfortunate. The professional man should know everything connected with building, and whether the quantities had been properly and correctly prepared; if he had not this knowledge, and could not accurately draw up specifications, he had no right to call himself an architect. When dealing with public bodies architects had not to decide whether quantities should form a basis of the contract; for local authorities' clerks often declined to have anything to do with quantities. It was honourable and desirable if they could induce their private clients to do so to make the quantities a basis of the contract. A question had been raised if the quantity surveyor was an unbiassed party. Their experience of him in London was that he was a man of the highest integrity, and he would be very sorry that it should go forth from the Association that they held any other view. The position of a quantity surveyor was one of great difficulty, especially where pressure was put on him not to alarm the builder with too many sheets of quantities. It might be asked was not the architect biassed in taking them out for his client? Naturally he would take a more or less one-sided view in the matter. The architect who kept his hands clear certainly occupied a far more independent position than he otherwise could. However careful one might be, errors were liable to creep in; and if in the case of an architect who had taken out the quantities there turned out to be anything deficient, the builder would point out the error, and invariably rake it up in the architect's face when a difficulty arose, even if the architect had borne the loss out of his own pocket. Should, again, young architects act in this capacity for architects in practice? He thought it was very unwise for an architect to permit this to be done. He invariably declined to allow it, for there had been cases where a young man had made use of the drawings for a similar house in another part of the country, using the same bill of quantities for both. Old-established architects maintained the desirability of definite distinction between the architect and the quantity surveyor. He thought the time had come when surveyors ought to have a diploma or certificate, so as to show who was, and who was not, a recognised practitioner. After all, the particular end in view should be the client's interest. If by taking out quantities, or any other thing, the interests of his client suffered, or if builder's, client's, or architect's interests clashed, the young professional man should give this branch of business up, and stick to legitimate practice.

Mr. J. D. Mathews remarked that the general opinion seemed to be that the architect might be a surveyor, and that, therefore, he should endeavour to do all he could to fill up his time. Quantities might be an evil, but they could not be avoided. In the keen competition in the building trade, and the limited time allowed to send in tenders, it was necessary for those tendering to obtain quantities before estimating one against another. The more accurate and definite these were, the better was it for all parties concerned in a building. There was one feature of the question frequently overlooked—the client's. He knew nothing about quantities; he placed himself in the architect's hands, and looked to him for the future building. If, therefore, the quantities were prepared by a third person, he was practically irresponsible to the client. There was reason to fear that the loss of this branch of work was largely due to the insufficient education of architects. He had found the taking out of quantities of great assistance in personal education, and had never carried out buildings with such ease as those in which he had taken out the quantities for himself. He saw no danger nor objection to making the quantities part of the contract. There was just as much likelihood of making an error against as in favour of the builder. It was a paying branch of the profession, and one which the architect need not surrender.

The Chairman, in closing the discussion, expressed a wish that the other side of the question—the purely artistic one—had been more strongly supported. It was satisfactory, however, to see that the discussion had taken so practical a turn; it had shown that the members were as desirous to excel in the practical parts of the profession as in the higher branches of designing.

HYGIENE APPLIED TO DWELLINGS.

Mr. B. H. Thwaite, of Bolton, read a paper on "Hygiene Applied to Dwellings," before the Manchester Architectural Association last week. He said that seeing the principal questions of the day are how to revive our languishing trade, and our position as a trading country in the future, a few words on the subjects and their relation to architects will not be out of place. In an interesting article on the retrograde movements in British trade, Mr. Edmund Ashworth, of Bolton, states that the falling off in British exports for the four years following 1873 equalled the enormous sum of £158,264,051. This result he clearly proves to be principally owing to foreign competition, and it is palpable that if foreigners can and do and obtain all the latest improved machinery, our success in competition will depend upon the superior physique and energy of our working population. We have certainly the advantage of a more temperate climate than the Continentals, and a more bracing and invigorating atmosphere, but the latter advantage may be rendered nugatory by allowing the working population to breathe impure air, deteriorating the physique, and rendering them incapable of procreating healthy offspring. We have a proof of this by the evidence given before the Factory Acts Commissioners in July, 1872, when, in reply to a question by the chairman, Sir James Fergusson, Bart., Mr. Brownlow replied to the effect that labour in bleachworks was exhausting and laborious. Then, again, many of the rooms in bleachworks are very badly ventilated. Mr. Fergus Ferguson, surgeon, stated that the number of children of thirteen years physically unfit for work goes on increasing year by year; he also stated that the physical vigour of the factory operatives had deteriorated during the last fourteen years. The ill-ventilated dwellings and schools contribute the first elements of disease, and the ill-ventilated workshops complete the quota of the necessary requisites to break up the constitution. Pulmonary consumption is the commonest form in which the disease exhibits itself. Mr. Collins, analytical chemist, had kindly allowed him to make use of some recent analyses he has made in the neighbourhood of a manufacturing town: Atmosphere of public park, carbonic acid, per cent. 0·0394; oxygen, per cent. 20·97. Sitting-room of dwelling, carbonic acid, per cent. 0·127; oxygen, 20·71. School-room, carbonic acid, 0·203; oxygen, 20·64. Card-room of mill, carbonic acid, 0·211. According to the late Dr. Parkes, the amount of carbonic acid in the air should never be allowed to exceed six volumes in 10,000, and here we have in dwelling, school, and card-room an average of 20 volumes of carbonic acid. The physique of the working population may well deteriorate. According to Mr. Ashworth, the Continentals work 72 hours per week, and we are limited to 56½; so it is clear our working hours must be increased to enable us to compete with them. But let the dwellings, schools, and workshops be ventilated, and our working population will become more vigorous and energetic, and the longer hours, with good ventilation, will not exhaust them as much as the present working hours, with deficient ventilation. Architects, by the construction of healthy dwellings, schools, and workshops, may thus effect a great and beneficial change in the physical condition of the working population.

WEST LONDON SCHOOL OF ART.

The annual exhibition of prizes to students of this school took place last Friday evening, the chair being taken by Mr. R. W. Edis, F.R.I.B.A., F.S.A. The prize drawings exhibit work of much merit, and the National silver and bronze medals are won by students of both sexes. The three recipients of the silver medal are—George Byfield, for a drawing of the human skeleton; Mary Rankin, for a drawing from the round; and William Swain, for a similar drawing of a torso. All these exhibit excellence of a high order, the foreshortened appearance, shading, and half lights of the torso being admirably rendered. The National bronze medal is awarded to Herbert Dallman for a copy of the "Gladiator," very careful in drawing, though wanting in expression. The same student receives a third-grade prize for a drawing of a dancing fawn. Kezia Hytche wins a bronze medal for a drawing of considerable accuracy and softness; and Hannah Rothwell for a drawing of a torso. Book prizes are awarded to Herbert Dalziel, Alfred Hayward, Samuel F. May, and Alfred Pearse, the subjects being drawings from casts. We notice among the other drawings several of interest as indicating the general work of the school. Studies of historic styles in colours by Emily Trower show the taste for ornament we often notice in these periodical school displays. It is, at least, a good sign to see Greek frets, egg and tongue and honeysuckle ornaments, studied in elementary drawing schools, and there is more benefit to be derived from such examples than in drawing flowers or making fancy pictures and designs, as in the design for a water service we noticed in the same room, where much natural ability and labour have been thrown away. The design for wrought-iron gates is an exhibit by Samuel Speller, in which some good points are observed, and the drawing is well shaded in ink. Another design we saw of some dado paper of a sage green and chocolate in three shades of the green, is not unpleasing; the pattern is thrown into hexagons, but the fret border does not at all agree with the pattern of paper—it is much too small. Robert Rickatson is the student. A design for an inlaid frieze in wood, several groups in oil colour of still-life objects, and a few water-colours make up the remaining subjects. In the last branch, however, the exhibited drawings are below par, and in many of the designs the idea of the student has been clearly to draw something more attractive than to make the best of his resources by proceeding on a principle.

At an assembly of the Royal Academy of Arts, held last week, Mr. Henry Stacy Marks was elected an Academician.

The parish church of St. George, close to Bristol, was totally destroyed by fire on Sunday morning. It is supposed to have been caused by the overheating of the gas stoves. The building was insured for £3,000, but the damage is estimated at double that sum.

We have received a letter from Mr. H. C. Bevis, accountant, of 8, St Martin's-place, Charing-cross, direct ng our attention to the subj cts of builders' book-keeping and estimating. Some time ago we commended a system of builder's book keeping on an improved plan by Mr. Bevis, and we now direct attention to a course of tuition by which that gentleman undertakes to impart a knowledge of these important branches of business.

A new English Calvinistic Methodist chapel was opened at Bridgend, Glamorganshire, last week. It occupies the site of the old savings' bank, and is Early English in style. The materials used for external walls are red pressed Pencoed bricks and Bath stone dressings; the interior is plainly furnished, and has a coved roof at the level of the collar beams. Mr. H. C. Harris, A.R.I.B.A., of Cardiff, is the architect, and Mr. Edmund Rees, of Pencoed, the builder.

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ILLUSTRATIONS.

BELHAVEN CHURCH, GLASGOW—DESIGN FOR YARMOUTH TOWN HALL—"BUILDING NEWS" CLUB DESIGN FOR A VILLAGE CLUB-HOUSE—OFFICES OF THE GRESHAM LIFE ASSURANCE SOCIETY.

OUR LITHOGRAPHIC ILLUSTRATIONS.

BELHAVEN UNITED PRESBYTERIAN CHURCH, GLASGOW.

This church has been built in the west end of Glasgow by a new congregation formed in the district about three years ago. It was opened for public worship about the end of last year. The walls are built of a freestone from Netherwood quarry. It is somewhat rough in texture, but has excellent weather qualities. For the nave pillars and arches, and other interior work, a finer grained stone from the Overwood quarries was employed. The walls are plastered internally, and the ceiling, which is a semi-decagon in form, is lined with wood, and richly decorated in colour. The walls are also elaborately decorated from designs by the architects. The west gable is filled with stained glass, having figure subjects illustrating the Parables; some of the smaller windows are also filled with stained glass, with figure subjects illustrating the Acts of Mercy. Accommodation is provided for about 950, and the cost was about £12,000. There is a fine organ in the church, built at a cost of over £1,100 by Messrs. T. C. Lewis and Co., of London. Mr. Andrew Wells, of Glasgow, executed the decorations, and the stained glass is by Messrs. Adam and Small, also of Glasgow. Messrs. Campbell, Douglas, and Sellars are the architects.

YARMOUTH TOWN HALL.

The accompanying plate illustrates one of the few Gothic designs submitted in competition for the Yarmouth Town Hall, and was at the time criticised favourably in our pages. Messrs. Bell and Roper, of 4, Garden-court, Temple, E.C., are the authors.

A VILLAGE CLUB-HOUSE.—"BUILDING NEWS" DESIGNING CLUB.

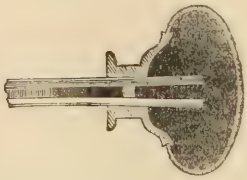
This design is the one which we placed first in the competition by members of our "Designing Club," and our critical remarks upon this and the whole series will be found in our issue for November 29th last. We shall publish the design by "S. in a Circle," to which we awarded the second place.

OFFICES OF THE GRESHAM LIFE ASSURANCE SOCIETY — SAINT MILDRED'S HOUSE — THE POULTRY.

We illustrate to-day the recently-finished and conspicuous stone structure, which occupies so important a position at the junction of Cheapside with Cornhill, Lombard, King William, and Queen Victoria streets. We have previously described the leading points in the building, see page 621, Vol. XXXIV., and more recently, to which we refer the reader. Mr. A. Killby was the contractor, and Mr. J. J. Cole, of Finsbury-circus, the architect, the cost having been about £40,000.

GULLIVER'S PATENT WEDGE-LOCK SPINDLE.

Many and ingenious are the plans devised to overcome the constant trouble caused by the failure of the ordinary arrangement of the common door-knob. We have from time to time illustrated and described many methods by which this has been effected in connection with the better kinds of handles; but the cost of their adoption has hindered their application to the common sorts. Mr. G. Gulliver, of Barnsley, has brought under our notice a very simple plan, applicable to the commonest knob sold, at a fractional increase of cost, which is certainly the best we have yet met with. The knob is fixed by driving a wedge through the hole shown on the neck of the knob, and passing it through the slit shown on the spindle.



By this means the end of the spindle is opened, and it becomes enlarged—dovetailed, in fact—inside the knob, and becomes as firm as if knob and spindle were in one piece. As before-stated, any knob having the ordinary square hole to receive the spindle is available. No other preparation is required beyond a plain hole through the neck to admit the wedge; no part can get out of order — thanks to the absence of screw threads, catches, or springs. The method of fixing is so simple as to be understood at a glance by anybody, and in the event of the loss of the wedge the point of a common iron nail forms a ready and complete substitute.

RELATION BETWEEN THE TENACITY OF METALS AND THEIR RESISTANCE TO TORSION.

The relation which exists between the resistances of metals to torsion and tension is a matter of considerable moment to the engineer; but the knowledge of the mode in which these forms of molecular resistance take place and react is not so satisfactory as could be wished.* Hitherto it has been thought a constant relation exists between torsion and tension, and that the resistance of a homogeneous material to rupture by tension could be predicated upon the results of experiments determining its resistance to torsion, so that the measure or modulus of the latter could be derived from that obtained for the former. Metals marked by extraordinary ductility, it has been observed by the writer of a paper, exhibited an apparent excess of strength when tested by torsion. In order to determine the value of the ratio of the scales for tension and torsion, the widest range of grade of steel was obtained that could be found upon the records of the Mechanical Laboratory of the Stevens Institute of Technology. "The values obtained were laid down on a sheet of profile paper, on which the ordinates represented the numerical value of the ratio obtained by the division of the tensile resistance in lbs. per square inch of original section to the resistance of the standard test-piece in foot-pounds of torsional moment, while the abscissæ were proportional to the total angle of tension at the moment when the test-piece exhibited the maximum resistance as measured upon the autographic strain diagram. A copy of this sheet is given by the writer, from which it is seen the values have a decided regularity notwithstanding the variety in the structure and qualities of samples. Drawing a mean line through the determinations so found it was approximately straight although probably really a parabola." The author says:—"At the angle of 150° the scale, 25.000lb., is closely accurate. The value predicted by common theory is, for brittle substances, 250, and for ductile materials, 188, the non-ductile substances giving the higher value. But we have now learned that the latter class of material, as cast iron, gives a value which is nearly but perhaps slightly higher than that theoretically obtained for ductile metals, while the ductile class, as the steels, gives a value which is variable, but which at the low angles of torsion, at which they are comparable with the brittle metals, somewhat exceeds the values theoretically given for the latter—thus inverting the relations of these values as predicted by accepted theory." The writer appears to favour the conclusion that the singular relation revealed by these experiments is due to the fact that those molecular modifications of cohesive force which produce a variation in the value of resistance to torsional stress in a different ratio. Such a conclusion, however, it would be unsafe to accept till a wider range of experiment has been made.

* A paper by Mr. Robt. H. Thurston, read at the Tenth Annual Convention of the American Society of Civil Engineers, treats on the subject.

INSTITUTION OF CIVIL ENGINEERS' ANNUAL REPORT.

The annual report of the Council of the Institution of Civil Engineers shows a prosperous condition. The report says "a special general meeting of members, associates, and honorary members was summoned for the 2nd of December, to consider and decide on proposed enactments and repeals. The modified bye-laws were then agreed to and adopted, subject to an amendment, that present and future civil engineering associates, but no others, should be designated "associate members," being the original recommendation of the council in their report to the general meeting on the 19th of December, 1876. By the resolution passed on the 2nd inst. this class, when fully constituted, will consist of such of the existing associates as are civil engineers by profession, and of such other associates as at the time of their election are engaged in some of the branches defined by the charter as constituting the profession of a civil engineer." There is an effective increase of the institution of 204, or at the rate of 7 per cent. on the present number of corporate members; 142 students have been admitted during the past session, while 56 were elected associates. The report speaks of the diploma of honour awarded to the collection of exhibits sent to the Paris Exhibition at the eleventh hour, and expresses a debt of gratitude to M. Tresca, President of the Société des Ingénieurs Civils, and other French members of the profession for their courtesy. Referring to the library, the care of successive councils in maintaining its completeness, and the increasing difficulty of this work is mentioned, owing to the great literary activity on the Continent, and it is worthy of record that the accumulation of reports and pamphlets is so large that they are bound up in 300 8vo., 83 4to., and 25 folio volumes, and form a feature of some significance. Each volume, it is said, contains 15 pamphlets, some of them dating from the 16th century, affording much curious information. The report regrets that greater use is not made of the library.

Among the list of subjects for papers for the session of 1878-9, we find the Triangulation Survey and Mapping of Countries and Districts; the Levelling of Countries either by Spirit Levelling, Vertical Angles, Barometers, or the Boiling Point of Water; the Effect of Lapse of Time on the Strength of Materials; the Best Combined System of Warming, Ventilating, and Lighting Large Buildings; the Materials and Different Systems of Road-making; Construction of Iron Piers for Viaducts; the Design and Construction of a Steel Bridge; the Treatment of Estuaries; Storage and Filtration of Water; Systems of Domestic Water Supply for Riverless Districts; Compressed Air as a Motive Power as applied to Machinery and for Traction on Tramways; Different Systems of Lifts in Use in Warehouses and Dwellings; Management of Underground Waters in Mining Districts; Application of Electricity to Lighting Purposes, &c.

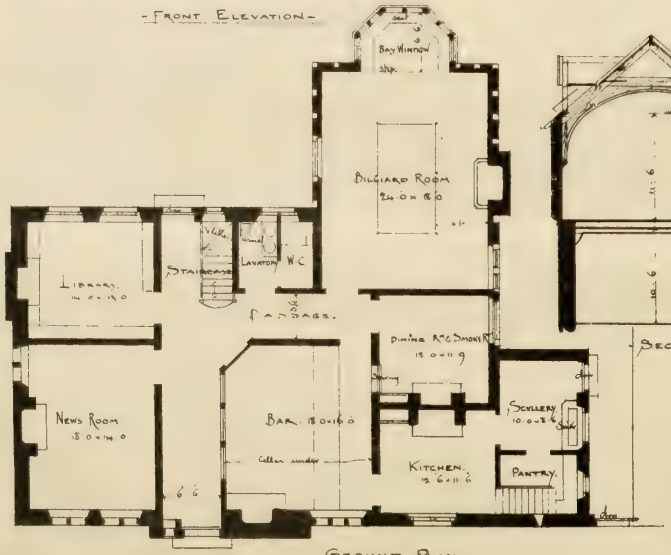
SELECTED DESIGN

- FRONT ELEVATION -

BACK ELEVATION.

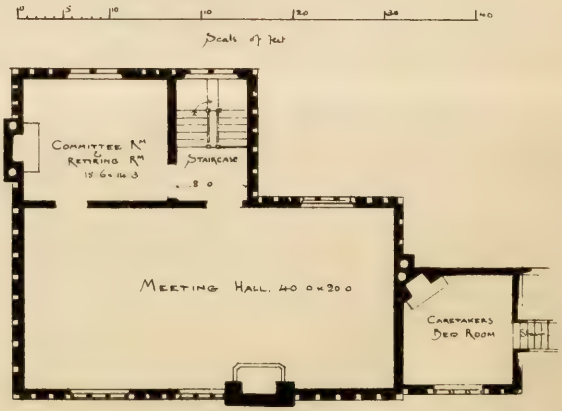
Building News Designing Club.

- A VILLAGE CLUB HOUSE -



GROUND PLAN.

SECTION.



FIRST FLOOR PLAN

Scale of feet

YARMOUTH TOWN HALL

design by Mrs Bell & Roper ARCHTS

OUR COMMONPLACE COLUMN.

FLASHING.

This is a piece of lead let into a joint of a wall above the edge of a lead gutter, &c., and dressed down over it to prevent the entrance of water. For flashings 6lb. lead is used in substantial works, though 5lb. is sufficient for ordinary purposes. For flats and gutters, cisterns, &c., 7lb. lead is commonly specified.

FLECHE.

The term *flèche* is now chiefly applied to the small erection with spire termination upon the intersection of the roofs of nave and transepts sometimes carrying the sanctus bell. For examples of carpentry flèches we refer to those at Amiens Cathedral, Beauvais, the Sainte Chapelle, and Nôtre Dame, Paris. The carpentry of these erections is often of the most ingenious and elaborate kind—the great object being to relieve the roof of the weight by timbers, struts, and braces, so as to throw the weight upon the walls. That at Nôtre Dame, Paris, is singularly ingenious. (See Viollet-le-Duc's "Dictionary"—art. "Flèche.")

FLEXURE.

The flexure of solid beams supported at the ends, and loaded, varies (1) directly as the load; (2) inversely as the product of their breadths and cube of their depths; and (3) directly as the cube of distance between the supports. If the load be uniformly distributed, the flexure is [illegible]ths of the amount produced by the load placed in the centre.

FLEXURE OF COLUMNS.

"J. A." writes: — Columns, when their lengths are considerable in comparison with their diameter, give way to loads which exceed their strength, not by direct crushing, but by bending sideways and breaking across, after the manner of beams. The following is the practical formula for the breaking load of a column, with a table of the values of the constants contained in it:—Let P be the probable breaking load; S, the sectional area of material in the column; l, the length of the column; d, its diameter, in the direction in which it is most easily bent; f and a, constants depending on the nature of the material, and the shape and mode of fixing the column: then—

$$P = \frac{f\,S}{1 + \frac{a\,l^2}{d^2}}$$

Material.	f. In lbs. on the sq. inch.	a. For pillars fixed at both ends.	Figure of column.
Cast iron .	80,000	$\frac{1}{400}$ *	Hollow cylindr.
"	"	$\frac{1}{3,000}$ *	Solid rectangle.
Wrght. iron	36,000	$\frac{1}{6,000}$	Thin sq. tube.
"	"	$\frac{1}{2,250}$	Solid cylinder.
"	"	$\frac{1}{4,500}$	Thin cylindrical tube.
"	"	$\frac{1}{1,500}$	L-shaped & + shaped sectn.
Timber	Average 6,500	$\frac{1}{250}$ *	Solid rectangle.

For struts or columns jointed or rounded at both ends, take four times the value of "d" given in the table. For struts or columns jointed or rounded at one end, and fixed at the other, take twice the value of "a." It is to be observed with respect to the multiplier "a," that those values only of that quality which are marked * have been deduced directly from experiment, the others having been inferred from those three by means of the probable supposition that they are proportional to the flexibility.

FLINT.

A variety of quartz, consisting almost wholly of silica, with a little lime, oxide of iron, water, carbon, &c. The chief use of flint is in the manufacture of fine earthenware, for which purpose it is first calcined, then thrown into cold water, and afterwards powdered.

"J. A." writes:—"Flint is a well-known silicious mineral, the true native place of which is the upper bed of the chalk formation, where it occurs in regular beds. Gravel consists principally of flints which have been rounded by attrition, and by exposure to air and moisture have acquired a yellowish-red colour. Flint is usually of a grayish colour. It is harder than quartz; thin fragments of the black varieties are translucent; it is fragile, and being rarely laminated, is broken with equal facility in almost every direction; specific gravity, 2.594. It is infusible, but [illegible] opaque and white by the [illegible] heat. [illegible], chisels, rasps, scrapes, wedges, arrow-heads, spear points, dagger points, and axe-heads were in ages past made from flint. An interesting work on this subject is 'The Ancient Stone Implements, &c., of Great Britain,' by John Evans, F.R.S., F.S.A."

FLOORCLOTH.

"J. A." writes:—This material is made partly of hemp, and partly of flax; the former being the cheaper of the two, but the latter better fitted to retain the oil and paint on the surface. To avoid the necessity for seams or joinings in the cloth, looms are constructed expressly for weaving the canvas of the greatest width likely to be required. When brought to the floorcloth factories the pieces of canvas have generally one of these scales of dimensions:—100 yds. long × 6 wide, 108 yds. × 7 yds., 113 yds. × 8 yds. The flax and hemp are spun, and the canvas woven in Scotland; the degree of fineness is generally about 16 or 18 threads to the inch (linear). The canvas is cut into pieces from 60ft. to 100ft. long; each piece is then stretched over a frame in a vertical position, a wash of melted size is then applied by a brush to the surface of the pieces, and while this is still wet the surface is well rubbed with a flat piece of pumice-stone; this process wears down the irregularities on the canvas, and a good foundation is made at the same time for receiving the oil and colour afterwards applied. The paint used is the same as that employed for house-painting, mixed with linseed oil, but it is much thicker or stiffer in consistence, and has very little turpentine added to it. The canvas receives many coatings on the back as well as on the front, well dried and smoothed at intervals. The printing of floorcloth is carried out on nearly the same principle as papers for walls of rooms; and that of colour-printing—viz., the successive application of two or more blocks or engraved surfaces, each one giving a different part of the device from the others, and being supplied with paint of a different colour. The paint (say red) is applied with a brush to the surface of a pad or cushion formed of flannel covered with floorcloth; the block, held by a handle at the back, is placed face downwards on this cushion, and the layer of paint thus obtained is transferred to the canvas by pressing the block down on the same; a second impression is made close to the former one, and so on throughout the length and breadth of the canvas; each impression is about 1ft. 3in. square. The proper "junction" or "register" of these successive impressions is aided by pins at the corners of the blocks. When the whole surface has been printed with one colour, all others are added in succession in a similar way. A kind of floorcloth, one that is coming fast into general use, is made from dried linseed oil and ground cork pressed on canvas by rollers—it is called "linoleum." The canvas is coated at the back with a layer of the same oil in a state of paint, and the upper or principal part is painted or printed like ordinary floorcloth. Some floorcloths are made without the oil, consisting only of cork shavings, cotton, or woollen fibres, and caoutchouc, spread upon a cotton or canvas back, and embossed with patterns. Another kind of floorcloth is composed of indiarubber, gutta-percha, and cork; it is called "kamptulicon" floorcloth. It is prepared and painted in a manner very similar to ordinary floorcloth in lengths of about 10 yds. × 1 or 2 yds. wide. Its peculiar characteristics are softness, warmth, and elasticity. It is about one-third higher in price than floorcloth. Linoleum is manufactured at Staines.

FLOORS.

Floors are generally classified as "single," "double," or "framed," according to the method of construction. In *single* floors the joists necessary to support the boarding bridge from wall to wall, if possible the shortest way of rooms, are spaced about 1ft. apart, the scantling varying according to length of bearing and strength required. The breadth of joists should not be less than 2in., to hold the nails securely and prevent splitting. The ends of joists should [illegible] in walls from [illegible] to [illegible], and be [illegible] to plates either resting on walls, on [illegible], or on corbels. In ground floors the [illegible] are supported at short intervals by [illegible] built on piers or dwarf walls. Single [illegible] floors are not recommended for spans exceeding 15ft., in consequence of their tendency to sag. When used for larger spans they should be cross-braced to increase their stiffness. Herring-bone strutting is best for this purpose, as it is not affected by any [illegible] or warping that takes place, remaining firmly braced between the joists. An increase of stiffness is also secured by a careful filling-in round ends of joists. No mortar should be allowed between the rough abutting surfaces of bricks and timber, so as to prevent the moisture from mortar affecting timber. In thin walls a sheathing of zinc or pieces of slate may be fixed round the ends of joists to prevent the passage of damp. Single floors are stronger than compound floor with the same quantity of timber. The pressure is equalised better over length of walls—they take up less wall space, and admit of a ceiling being easily fixed to the lower edges of joists. To prevent the passage of sound a "pugging" is necessary, laid on the ceiling or on "sound boarding." Strips of felt or vulcanised indiarubber laid along joists may be used for the same purpose. The points of contact between floor-boards and ceiling acting as conductors of sound may be reduced by having every fourth or fifth joist deeper than the others, to which ceiling joists would be fixed for forming the ceiling. This method requires a greater depth of wall space, but admits of a stiffer ceiling being formed. In *double floors* girders are used, spaced from 6ft. to 10ft. apart, so as to reduce the bearing of joists. This construction admits of the weight being concentrated over piers or solid parts of walls. The ends of girders should have a bearing of at least 6in. on walls, resting in cast-iron shoes, or on oak or stone templates, a space being left round the ends for ventilation, the weight of wall over space being taken by a covering stone or an arch. The joists are best used in as long lengths as possible, bridging two or three bays, and cogged down to the girders to prevent any lateral movement. A ceiling may be formed, as in single floors, the portion of girders projecting being either left rough, wrought or cased with boarding, or lath and plaster; or a level ceiling may be procured by fixing joists to girders. *Framed floors* are adapted for large spans, or where great strength is required. They consist of girders spaced usually about 10ft. apart, with binders framed between at intervals of from 4ft. to 6ft., the bridging joists being secured on to the binders. The ends of girders should have a bearing of from 9in. to 12in. on walls, resting on stone templates, with space round ends for ventilation. An increased thickness of wall may be necessary to give the requisite support to girders, or corbels may be introduced under ends, the better to distribute the pressure. The ends of binders are framed into sides of girders usually with a tusk tenon and mortice. To avoid the cutting and consequent weakening of girders an iron stirrup may be fixed across girders to support the binders. Care should be taken in spacing the binders to avoid loading the girders near middle of length. Girders sometimes require to be strengthened by "fitching," "trussing," or "building up," or girders of rolled or plate iron may be requisite. In framed floors the ceiling joists are fixed to the binders, or they may be ceiled direct to the bridging joists, the projecting timbers forming panels. In all cases trimming has to be resorted to when the ends of joists cannot have a bearing on walls, as in front of fire-places, near flues, for stairs, lifts, &c. The ends of such joists are framed into a "trimmer," which is supported at the ends by "trimming joists" or on walls. Floor boards should be prepared some time before being required, so as to get well seasoned. The narrower the widths used the less any effects of shrinkage show after fixing. With straight-jointed floors the boards or battens are gauged to the same widths, and the joints continued throughout the length of floor. With broken-jointed floors the unequal widths necessitate a break in the joint at every length. In either case the boards should be

compressed into position before fixing. The best joint for flooring is ploughing and tongueing with wood or galvanised iron tongues, or a rebated and filleted joint in floors exposed to great wear, giving a greater thickness of timber, and admits of easy removal for repairs. With either method an open joint is avoided, preventing up-draughts, injury to ceiling by the ready passage of water, or any accumulation of offensive matter under floors. Superior floors of pitch pine, oak, or parquetry, are fixed to joists, or on a counter floor of rough boarding, by skew nailing through the advancing edges and securing adjoining edges with tongues fitted into grooves or with dowels. Ventilation should at all times be provided between floors and ceilings, especially under ground floors, where a layer of concrete should also be spread to prevent the rise of damp.—*Weights*: The following has been compiled chiefly from Tredgold. Weight of a square of single-joisted flooring, from 1,260lb. to 2,000lb.; weight of a square of framed flooring, from 2,500lb. to 4,000lb. Weight that floors should be calculated to sustain, including the weight of floor: For dwelling-houses, 1¼cwt. per foot super; public buildings, 1½ ditto; warehouses, &c., 2½ ditto. To find the depth of a joist when length of bearing and breadth are given, the distance apart being 12in. from centre to centre.—Rule: Divide the square of the length in feet by the breadth in inches, and the cube root of the quotient multiplied by 2·2 for fir will give depth in inches. For binders 6ft. apart.—Rule: Divide the square of the length in feet by the breadth in inches, and the cube root of the quotient multiplied by 3·42 for fir will give depth in inches. For girders 10ft. apart.—Rule: Divide the square of length in feet by breadth in inches, and the cube root of quotient multiplied by 4·2 for fir will give depth in inches. Ceiling joists with a breadth of 2in. should have ½ an inch in depth for every foot of bearing. Trimmers are usually calculated as binders. Trimming joists should have a breadth equal to common joists used with an ¼ of an inch added for every joist supported by the trimmer.

TABLE OF SCANTLINGS FOR JOISTS, &c.

Length of bearing in feet.	Girders 10 feet apart.		Binders 4 to 6 feet apart.		Joists 1 foot apart.		Ceiling joists 1 foot apart.		Wall plates or templates.	
	Depth.	Breadth.	Depth.	Breadth.	Depth.	Breadth.	Depth.	Breadth.	Depth.	Breadth.
6			7	4	5½	2	3	2		
8			8	5¼	7	2¼	4	2		
10	10	3	9	5	8¼	2½	5	2		
12	11	3¼	10	6	9	2¾	6	2		
14	12	3½	11	6½	10¼	3	6½	2½	3	
16	13	3¾	12	7	11¼	3¼				
18	14	4	13	7½	12	3½				
20	15	4¼			12¾	3¾				
24	16	4½								
28	17	4¾								
30	18	5								
36	19	5½								
40										

—L. C. W.

FLORENTINE RENAISSANCE.

C. P. Edwards writes:—"The Renaissance was an attempt to adapt classical forms with more or less freedom to modern buildings. The Pitti Palace, constructed by Brunelleschi, may be considered a type of the Florentine style. The façade is of rustic work of considerable projecting, terminated by a massive, widely-projecting cornice supported by consoles. The fenestration is regular, the openings being round-headed, the windows generally in pairs, under an enclosing arch, with the space between sometimes perforated. The windows are small compared with the building, and generally occupy about half of the story. In later specimens the orders were applied, superimposed, to the façade, the main cornice became less heavy, and the details generally showed greater refinement. Severity marks all the palaces of this style, the horizontal lines being in all cases strongly emphasised."

[The Strozzi and Pandolfini Palaces are also admirable examples of the Florentine Italian.]

FOSSE.

The artificial ditch or trench round castles, often filled with water; together with the mound, it formed the principal defence in British camps. An example may be seen at Old Sumar, Wilts.

ST. ALBAN'S CATHEDRAL.

THE controversy as to the roof of St. Alban's Cathedral still continues. The subject of the alleged "ruinous" condition of the outer nave roof having been brought before the Council of the Royal Institute of British Architects at their last meeting, the following resolution was passed:—"The Council of the Royal Institute of British Architects having learnt from John Oldrid Scott, Esq. (Fellow), that that he is satisfied there is no difficulty whatever in repairing the oak roof now existing over the nave of St. Alban's Cathedral, express their decided opinion that in that case it would be most desirable to abandon the proposal to erect a new roof over the same."

Mr. J. O. Scott, in a letter to the *Times*, replies to Mr. Street's communication, which we published last week. He thinks that the resolution arrived at by the restoration committee—"That, provided the necessary funds are forthcoming by next Lady Day, the present roof shall be retained within the lines of the new one with such repairs as are required"—is highly satisfactory. "The vast improvement which the addition of a higher roof will be to the cathedral is secured, while the old roof, which, though out of repair and a complete patchwork of fragments of older construction, is full of interest to those who care to examine it, will be retained and will become far more accessible than it has been hitherto. This is a solution of the question which I have advocated throughout, and which I have every reason to believe my father, Sir Gilbert Scott, would have come to; for I am well aware of the great importance he placed on the retention of the old roof within the lines of that higher and more architectural one which he would have rejoiced to see added to the building. Turning now to Mr. Street's letter, there are several points requiring comment. In his paper read before the Society of Antiquaries he urged two opinions, both expressed with equal assurance of their being matters beyond all doubt or question, and on these the society based their resolution condemning our proposals at St. Alban's. One was, that the old roof could and ought to be preserved. This has now been acceded to, as I have shown. The other was a matter of great importance, as, if correct, our intentions would certainly be indefensible. Mr. Street stated positively that from his examination he had ascertained that no high roof could have ever co-existed with parapets on the nave at St. Alban's, and that to place one, as we propose to do, within the present parapets would be to innovate a combination which had never at any time existed, and therefore would be false restoration. Mr. Street repeats this assertion in his letter to-day. Now, without going into details, I may state that a minute and accurate investigation has enabled me to prove to the satisfaction of the committee that Mr. Street's theory is entirely without foundation. There are evidences to prove that two high roofs have at some time existed, and that, when the present parapets were built, the Norman walls were raised between 3ft. and 4ft. The lower of the two high roofs combined with the raised walls makes a parapet and gutter as at present quite practicable, and it is this roof line which we propose to follow, and in doing so to restore faithfully what I firmly believe to have been the design of the nave in Decorated times. I wish to take this opportunity of begging those who entirely sympathise with these proposals, and also those who must allow that half a loaf is better than no bread, to assist me in my earnest endeavours to keep the old roof within the lines of the new one as an object of curiosity and historical interest. The sum required is only a few hundreds, which will surely be forthcoming; for, as I have shown, its retention is made conditional on this. I would point out to Mr. Street that the effect of running down this compromise or combination, if successful, will not be to prevent the addition of a high roof, but to insure the destruction of the present one, which I for one should deplore. I cannot conclude without asking whether it is really desirable that on a question of opinion and taste an architect should be coerced by his fellows in this way? St. Alban's Cathedral is not the only public building in the country (nor is Mr. Street the only architect who bestows earnest care on his art), and if it became the custom for every one who chanced to differ from what was being done by a brother architect to endeavour to influence his clients or employers, it seems to me that our profession would become a very ridiculous one. In this case the only reason I can think of is that I am a comparatively young man, and it is not thought that any architect under 40 ought to be left to himself when he is in charge of an important work. Finally, Mr. Street says that this is a case of 'doctors disagreeing.' I object to this expression as quite inapplicable. No second doctor has as yet been called in to prescribe for the interesting patient at St. Alban's. The friends have so far shown themselves quite satisfied with the advice they have received from me, while the suggestions so pertinaciously thrust on them from without are not the result of any exact diagnosis of the case, but are only founded on surreptitious peeps at the patient's tongue and imperfect feelings of his aged pulse taken while affectionately pressing his hand."

In a letter to the *Guardian* Archdeacon Grant corrects a misstatement which appeared last week of the reason which impelled Mr. John Evans and himself to retire from the faculty committee appointed to superintend the restoration and repair of St. Alban's Cathedral:—"Our retirement was not 'in consequence' of the resolution there given. Indeed, we were not even present when it was passed. But our resignation was due to the rejection by the committee of a previous resolution proposed by us, to the effect that, in view of the great divergence of judgment in regard to the roof of the abbey, the acting architects (Messrs. Scott) be requested to confer with the Institute of British Architects on the subject. My own opinion is that, having no longer the guidance of that eminent master of his craft, the late Sir G. G. Scott, we are bound to have, and the nation has a right to demand that we have, the aid of the highest architectural skill and experience in a work so important and so critical as that in which we are engaged. We are warned by two learned societies, and by some of the most distinguished architects of the day, that the proposed *new* roof is 'opposed to the principles of all sound restoration,' and that 'it would be most desirable to abandon' it. The committee, by a majority consisting of five of the gentlemen present against two, rejected our proposal, and I have thought it my duty to retire."

A very long letter in his usual style, from Sir Edmund Beckett, appears in the *Times* of Wednesday. It contains a great deal of smart writing, but not very much about the points at issue, and it seems to us a pity that a perfectly legitimate controversy has been embittered by the introduction of real or imaginary private grievances which have nothing to do with the matter in question.

Mr. Street replies in the same paper to Mr. Scott, regretting that the latter should speak of his having made a "surreptitious" visit to St. Alban's to look at the nave roof. "The facts

are that I and two other architects went there as members of the committee of the Royal Institute of British Architects for the conservation of ancient monuments, and that before going I wrote to Mr. Scott to ask his permission and for the assistance of his clerk of the works, who, by his order, with the contractor received us and enabled us to go into the roof in all parts. The object of our visit was to see whether or not the roof was in a ruinous and dangerous state. Mr. Scott had reported in June last that it was not so. But in August, when it was decided by the committee to erect a new roof, this report of his was emphatically contradicted, and until our visit the question rested in this way. We all felt that in supporting and confirming Mr. Scott's report of June we were aiding him, and the very fact that he is a comparatively young man made us the more glad to do so. We had never seen any report of his save one, and with that we were and are entirely in accord. It would be impossible without diagrams to go into the questions of the parapets and pitches of the roof. Mr. Scott may possibly make a convert of me about the parapets, though I may still think him quite wrong as to the pitch of the roof. But this is not the question which requires settlement. As I have before explained, this is simply whether an old oak roof which can perfectly well be repaired ought or ought not to be repaired."

LIGHTNING-ROD CONFERENCE.

THE Council of the R.I.B.A. have appointed two of their members to meet delegates from several scientific societies in order to confer as to the best methods of protecting buildings from lightning, and in accordance with a resolution of that conference the questions appended below have been issued, and answers are invited before Monday, the 20th January, 1879:—

1. Have any buildings in the construction of which you have been professionally engaged, or which are otherwise well known to you, been struck by lightning?
2. If so, state briefly the damage done to them, describing their general plan and construction by sketches or otherwise, particularly noting the position of any metal work to roofs, pipes, &c.
3. Were the buildings furnished with lightning conductors? If so, describe them in relation to the following heads:—
   a. Their materials and dimensions.
   b. Their attachment to building.
   c. Their connection with the ground.
   d. Their upper terminals.
   e. The height of conductor above chimney or other adjacent part of the building.
   f. If there existed more than one conductor, state the distance from one another.
4. What was the distance of the point struck, horizontally and vertically, from the conductor?
5. Was any damage done, and, if so, how much to the conductor, and in what manner?
6. Give particulars as to any trees within a short distance of the building struck.

THE LEGAL RESPONSIBILITIES OF ARCHITECTS.*

THERE is a great deal of confusion in the public mind as to the limitations of the responsibility of those who are employed to direct construction, and it is not impossible that architects themselves do something to increase the confusion, not so much from ignorance of what the law requires of them as from the readiness with which some, in their eagerness for employment, bind themselves to terms of excessive harshness, and perhaps also the ambition of some to claim an authority over clients and contractors more absolute than is always necessary or desirable.

There is a popular idea that the architect is somehow responsible, not only for his own work but for that of all the contractors for a building. He is supposed to be in some way capable of watching at once all the workmen employed in the structure through the whole of their working hours, so that the mechanic who has been astute enough to conceal his bad mortar and rotten timber during the periodical visits of superintendence, passes for having only yielded to the impulses of human nature, while the architect, who failed to find him out, is denounced as incompetent.

Especially is the final certificate supposed to confer a sort of plenary absolution on the contractor who has managed to obtain it, and who thinks himself entitled to keep the profits, whether honest or dishonest, which he may have been able to secure by means of it, on the pretence that the architect's approval supersedes for him the faithful execution of his contract.

But if builders find it convenient to claim such preposterous authority for the acts of the architect, which are profitable to them, the public, on the other hand, seem to find difficulty in holding their agents, in matters of construction, to even moderate accountability, and their attempts to do so result in some cases in gross injustice to their professional adviser, and in others in such extraordinary contracts with architects as that which the Indiana State House commissioners have succeeded in getting one of them to accept.

It would be much to the advantage of the profession and the public if their mutual duties and responsibilities were better understood, and a reference to cases in which the law on such subjects has been established may be interesting, even if very incomplete.

The general rule of law in all cases of employment of professional advice is that the expert shall be bound to use in discharging his trust an ordinary amount of care and diligence, together with an average degree of skill and knowledge of his business. The highest degree of skill is not expected of him; but neither can he satisfy justice, as has been claimed, with such an amount of intelligence as may have been shown by great masters under unfavourable circumstances. What is required of him is a continued exercise of the best skill which, with ordinary talents and opportunities, he could be expected to attain.

Perhaps in practice want of care and diligence is more frequently imputed to architects than want of skill, and courts are stricter in interpreting the law in that respect. In an English case an architect, sued for negligence, replied that he found his instructions were disregarded by the builder with the approval of the owner, and thinking it useless to waste his time in frequent visits, he had only been to see the work about once a month afterwards. That seems not unnatural, at least; but the court did not find it justifiable, and judgment was given against him.

In general it may be remarked that juries' notions of faithful supervision differ materially from what architects are apt to understand by "superintendence," and he who has a difficult or dangerous piece of construction or alteration to carry out will consult his own interest, in view of the risk of accident, so that want of diligence at least may not be imputed to him.

As to want of due care and skill, there seems to be some variation in the practice of different countries.

The French Code says, section 1792: "If the edifice built at an agreed price perish in whole or in part by faults in its construction, even by defect in its foundation, the architect and the builder are jointly responsible therefor for ten years."

This is the law of France, and, in substance, of England and the United States. The French jurists make some further distinctions. It has been decided that the architect is solely responsible for damage or failure in a building which has been strictly carried out in accordance with his plans and under his directions, if the workmanship and materials were not defective; and this decision seems to overrule a claim which has been made, that the builder should be supposed to know as much of his own business as the architect, and unless he protested against a faulty design he should share in the responsibility for it.

Another decision extends the responsibility of the architect to all cases of damage which may result from a violation or ignorance on his part of the rules of the art which he professes, or of the laws which it is incumbent on him to know, such as those relating to party-walls, or ancient lights, or the police or municipal regulations of the locality in which he builds; and it has been repeatedly held that the architect could not free himself from this responsibility, even by alleging the consent or the positive orders of the owner.

As to the architect's accountability for the bad quality of work done under his supervision, there is no obscurity whatever. The law says: "If the architect is charged with the surveillance of the work of the contractor, he can be held responsible for all the consequences of any negligence in his performance of this duty; so, whether it may be that the plan has not been faithfully followed, and the building is consequently defective, or the contractor has furnished bad materials or workmanship, those who suffer inconvenience from any of these deficiencies have a cause of action against the architect, subject to the limitation of the code, which says (Act 2,270) that "after ten years architects and contractors are discharged from the guarantee of work furnished or directed by them in accordance with an agreement as to price," and, of course, provided they can show that the damage or inconvenience could have been prevented by the exercise of due skill and care on the architect's part.

This seems a hard doctrine, considering that the architect has no interest in permitting the use of bad materials, and can wholly prevent it only by extreme watchfulness, if at all, while the builder controls every detail of material and workmanship, and if those furnished are defective it must be with his knowledge and collusion, and with intent to defraud the owner: and if he succeeds in his fraud the whole profit is his; but there is no doubt that it is the law in France and Great Britain, as well as this country, and a man who suffers from defective work in his house or other building, which might have been detected or prevented by what the court may consider reasonable care on the part of the architect, can recover damages from him. In the English and American practice it would seem that the architect is compelled to make good the whole loss if the owner chooses to require it, while the French courts seem to exercise a discretion in apportioning the indemnity between those to whose fault the loss is due. Thus, in a case where a bridge was washed away by a flood, the municipality sued the engineer to compel him to repair the loss; but the court decided that as, although the flood was an unusual occurrence, answering in part to what our books term an "act of God," still it was within the reasonable skill that the law expected of the engineer to provide against such occurrences, and his share of the responsibility was estimated at one-fourth, and he was condemned to pay one-fourth the damage.

In another case a town built a hall, and six years after its completion the stone began to flake off. The municipality sued the architect and builder jointly. It was in evidence that some of the stones were placed off their natural bed; and although it appeared that it was difficult to distinguish the beds in that particular stone, the court held that the architect ought to have been able to do so, and that it was one of the rules of his art not to allow such misplacing, and he was obliged to pay one-half the damages claimed.

One of the French commentators asserts the existence of an important rule—that if the superintending architect has given the proper direction for the execution of the work, and has, before the work is actually in place, pointed out defects in the materials on hand, he escapes liability. If he has not he is liable, but not as a principal. The principal is the direct cause of the damage—that is, the contractor or workman who by fraud or negligence has badly executed the work which was confided to him. He is the immediate cause of the damage, and should furnish the reparation. The negligence of the architect is only secondary and accessory, and he should only be held as a subsidiary—as a bondman in case of insolvency of his principal.

There seems to be some comfort in this, but without referring to the decisions on which the opinion was founded, it is impossible to tell how much authority it has. Certainly there appears to be no trace of such a principle in the English or American decisions, so that it is wisest for us to continue to think that a general supervision only is not enough to satisfy the law, and that in case of accident the courts will hold us, as the French say, *solidaires*

* A paper read at the twelfth Convention of the American Institute of Architects, by Mr. T. M. Clarke, Fellow.

with the builder in respect of damages, if any lack of due diligence or skill can be proved against us.

SCHOOLS OF ART.

Bristol.—The annual prize distribution in connection with the Bristol School of Art took place last week. At the Government examination of the 2nd grade, held in May last, 151 students presented themselves for examination, of whom 107 satisfied the examiners in one or more of the four subjects. 178 exercises were satisfactorily worked by them, 85 gaining prizes. 35 students gained the full certificate of the 2nd grade, having passed in the necessary number of subjects. Over 1,000 works by 104 students of the 3rd or highest local grade were sent to South Kensington for awards; of these 34 students gained 44 prizes. For the advanced local perspective examination 18 students presented themselves; 14 received the mark "excellent," two "good," one "pass," and only one "failed." At the anatomical examination six students presented themselves; four gained the mark "excellent"—a mark equal to a Queen's prize in the national competition—one "good," and one "passed." Government Free Studentships were awarded to four students for the highly satisfactory amount of work done by them during the year. Nineteen of the best 3rd grade prize drawings were retained for national competition.

The annual exhibition of drawings by students of the Carlisle School of Art was held on Thursday, Friday, and Saturday last, at the school premises in Fisher-street. They serve to show the excellent work that is being done under Mr. Lees' tuition, and include a monochrome of the Theseus by Lucy Atkinson which was placed third in the National competition in the spring.

A project is under consideration by the Chelsea and Battersea vestries for the erection of a new bridge to unite those parishes. The vestries will bring the proposal before the Metropolitan Board of Works.

The London School Board determined at their last meeting to hold an annual exhibition of drawings in eight of the ten divisions of London—the City and Westminster to be attached to other divisions for exhibition purposes—in the month of October. From the specimens shown selections will be made for an exhibition at the offices of the board in November.

A series of reports from the governors of British colonies respecting colonial timber has been presented to Parliament. The reports were made in reply to a circular from Earl Carnarvon in June, 1874, requesting information for his use as Colonial Secretary, and also for the Commissioners of Woods and Forests and the Institution of Surveyors. In almost every case a rapid diminution is reported, chiefly by the clearing of forests, by settlers and woodcutters, but also as notably in the case of the Canadian Provinces from fires, generally caused by the carelessness of dwellers on the coast.

Steady progress is being made with the boring of the St. Gothard tunnel, from the designs of M. Favre. The works have not been interrupted a single day for six years. The chief difficulties encountered have been the infiltration of water in the south portion, and the mass of decomposed felspar, mixed with gypsum, found under the plain of Andermatt. This plastic material swells on contact with moist air, and exerts pressure of terrible force, capable of crushing the strongest woodwork, and even arches of granite. In many cases it has been only possible to advance through this felspar (with manual boring) about one metre in three or four days; whereas, through granite, with compressed air and mechanical perforation, a regular advance of four metres in 24 hours has been achieved; through gneiss, six metres, and more. The popular vote on the Gothard question, which will probably decide the fate of the enterprise, is fixed for the second week in January. Meanwhile the Federal Council has passed the engineers' estimates for the seventh year of construction. Twelve million three hundred thousand francs have to be spent on the works during the period in question, and it is calculated that by next October the tunnel will have been bored to a length of 11,000 yards.

We have just received the balance-sheet of the Eastern Counties' Permanent Benefit Building Society for the 23rd year of its existence, ending July, 1878. The total receipts have been £37,148 14s. 8d., which, with the banker's balance of £552 0s. 6d., makes a total of £37,700 15s. 2d. The expenditure includes £13,260 for advances, and £13,497 3s. 3d. withdrawals on ordinary and paid-up shares, and £5,230 17s. 8d. on realised shares, and £2,080 12s. 10d. interest on deposits; salaries amount to £367 19s. 7d., and law costs, £211 18s. 8d. After making all deductions, a balance of assets over liabilities is shown of £2,886 3s. 10d.

Building Intelligence.

Bowdon, Cheshire.—On Thursday week the memorial stones of a new Baptist chapel and schools were laid at Bowdon. The building will be Italian in character, of red brick, two stories in height, and is being erected at the junction of Hale-road and Byrom-street. The lower story will be used for school purposes, and will comprise a school-room 67ft. long and 39ft. wide, with two class-rooms, library, &c., and will be provided with a separate entrance from Byrom-street, and also have communication with the chapel by means of a staircase in the tower. The upper floor comprises the chapel, 73ft. long, 39ft. wide, and 28ft. high, with a gallery over the main entrance, and will afford accommodation for nearly 500 persons. The interior of the chapel will be finished entirely in plaster—the ceiling being semi-elliptical in shape, divided into panels, with moulded and enriched plaster ribs, and will offer good scope for future decoration. Vestries are provided at the back of the chapel, with separate entrance from Byrom-street. The front faces Hale-road, and will be flanked with a handsome campanile, rising to a height of 64ft. The main entrance to chapel will be approached by a flight of stone steps, and will be composed of a triple archway—the spandrels of arches being filled in with a diaper ornament in brickwork, over which will be three circular-headed windows: the whole surmounted by a pediment filled in with ornamental brickwork. The cost of the buildings will be about £2,100, and the works are being executed by Mr. J. Pennington, builder, Bowdon, from the designs and under the superintendence of Mr. William Owen, architect, 134, Deansgate, Manchester.

Falsgrave.—The new Wesleyan chapel at Falsgrave, in the East Riding, was opened on Friday. The style is Gothic. It is faced with buff bricks, ornamental red pressed brick arches, and stone dressings. The chief entrance is on the west side, through a porch which will eventually be surmounted by a spire. The seats are of pitch-pine, stained and varnished; the roof, an open one, is of similar materials. At the end of the chapel is a school-room 50ft. in length and 25ft. in width, shut off from the main building by revolving shutters, so that the whole can be thrown into one building. Ventilation is by Lawson's double current siphon ventilators. 500 sittings are provided at a cost of £2,000. The architect is Mr. D. Petch, of Scarborough. The contractors are: Brick and stone work, Mr. F. Horner; joiner, Mr. Wade; plumber, Mr. Wm. Bradley; slater, Mr. Hargraves; and painter, Mr. Wm. Wrightson.

Hyde.—Last week a new Unitarian Church, which has been in the course of erection at Flowery Field, Hyde, near Manchester, was formally opened. The work has been carried out from the designs and under the superintendence of Mr. Thomas Worthington, architect, Manchester. The nave measures 71ft. by 32ft., the transepts 20ft. by 12ft. 6in., and the choir (which has an apsidal end 25ft. by 18ft.; vestry and organ chamber 12ft. 6in. by 12ft. There are galleries at the entrance end over the vestibule and in the two transepts, with separate entrances and staircases for the use of the congregation and school children, the total accommodation provided being about 500 sittings. The building has been designed in the Perpendicular style. A disengaged tower rises over the main entrance to a height of 81ft. The choir has an apse end, with traceried windows, which are filled with stained glass figures of the Twelve Apostles.

Metropolitan Board of Works.—At the meeting of this board on Friday, the works committee brought up a report stating that further office accommodation was urgently required in connection with the Artisans' Dwellings Act department, and recommending that provision be made by raising a Mansard roof in accordance with plans prepared by Mr. Vulliamy, and that the work be carried out by Messrs. Hook and Oldrey, the contractors who have in hand the addition of a story to the premises. This was adopted after discussion. It was decided to oppose the petition of the parish of West Ham for a charter of incorporation, the opinion of the board being that that parish ought to be included in the metropolitan area. Half the estimated cost (£800) was voted towards opening the enclosed portion of Francis-street, Westminster, at the Victoria-street end. The drawings prepared by Mr. Wolfe Barry, C.E., of a bridge to carry the Fulham extension of the Metropolitan District Railway over Hurlingham-lane and Church-street, Fulham, were approved. A letter from the Treasury was read, stating in reply to the board's letter recommending the extension of the London Coal and Wine Duties from 1889 to the end of the century, with reference to the proposed new bridge over the Thames, that they are of opinion that, as the object of the proposal is to avoid the prospective increase of the rates in the year 1889, the consideration of it should be postponed until that time approaches. After much discussion it was decided by a majority of 28 to 23 to proceed with the Tower High Level Bridge Bill, and the superintending architect was instructed to prepare estimates and other necessary works. The whole question of the expediency of extending the tramway system in the metropolis was referred to the works committee in connection with the particular schemes to be brought before Parliament next year, and the engineer was instructed to give special attention to these tramway schemes, and to ascertain and report fully the views of the vestries and district boards thereon. A letter was read from the Gas Light and Coke Company, expressing their desire to offer the Board every facility so far as lies within their means in connection with the experiment now being made with the electric light, and stating that they are anxious for the opportunity of displaying the comparative powers of illuminating by gas, and requesting permission to make such temporary alterations in or additions to the public lamps at the refuge at the Middlesex end of Westminster-bridge as may be desirable; also stating that they will keep a careful account of cost, and will be happy to exchange information on the subject with the board. It was referred to the works committee.

Middlesbrough.—The new workhouse at Middlesbrough is completed. Designs for the workhouse were advertised for some time since, and the successful competitors were Messrs. Perkin and Sons, of Leeds. The total cost of the new workhouse, which is very similar to the new South Shields workhouse, will be about £50,000. The style is Gothic. About 60ft. behind the out-offices of the main building is the hospital.

Plymouth.—The Plymouth Theatre, burnt in June last, has been rebuilt from the designs of Mr. C. J. Phipps, F.S.A., Mr. Samuel Clarke, of Plymouth, being the contractor. The total cost of the work was £5,784. The accommodation generally has been much improved throughout the building, and the decoration is good. The box fronts are executed in patent fibrous plaster by Messrs. G. Jackson and Son, of London. The proscenium is formed by Corinthian pillars, surmounted by a figure and an arch; the tympanum over the drop-scene being filled with an artistic allegorical figure piece painted by Mr. William Hurford, of London. On either side of this figure piece are panels, decorated with vases of flowers standing before a cabinet, on a gold ground. These were specially painted by Mr. Fouracre. All the other painted decorations have also been executed in excellent style by Messrs. Fouracre and Watson, of Stonehouse, from designs of the architect. Generally the tone of the decorations is gilt ornament on a cream ground. The ceiling is Raphaelesque ornament in colours, on a light cream-coloured ground. The back walls of the proscenium are draped with paper of a sage green, with red flowers. The stage opening is 28ft. wide, the width between the walls of the stage being 60ft., and the depth is upwards of 50ft. from the footlights. The act drop and drop curtain were painted by Mr. Geo. Gordon, of London.

A new chapel is in course of erection at Caersalem, Brymbo, near Wrexham. Mr. Peleg I. Jones is the contractor.

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TO CORRESPONDENTS.

[We do not hold ourselves responsible for the opinions of our correspondents. The Editor respectfully requests that all communications should be drawn up as briefly as possible, as there are many claimants upon the space allotted to correspondence.]

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Cases for binding the half-yearly volumes, 2s. each.

RECEIVED.—A. F. S.—W. O. C.—G. H. Y.—S. and Co.—F. W. T.—H. G. L.—E. B.—R. and D.—T. C. C.

JAS. G. ELLISON. (The principle of conical openings has been applied to forms of outlets in iron, and we saw outlets of this description the other day in a new warehouse in Oxford-street, the object intended being to increase the draught up the flue and to reduce risk of down currents, the smaller slit or opening being towards the flue. The form of opening was not round but oblong, however. We do not know of any inlets so formed except your own.)—T. C. N. (Spring-gardens, S.W. Why not have consulted the directory?)

Correspondence.

DISCUSSIONS OF THE A.A.

To the Editor of the BUILDING NEWS.

SIR,—On Friday night I was present at the discussion at the meeting of the Architectural Association; this has given rise to a few thoughts, which I offer with great diffidence. In my opinion the choice of the subject was an unfortunate one, it being one of those questions, the discussion of which would bring but little profit to those whom the Association takes under its especial protection—viz., the young members of the architectural and allied professions. The time for study is already quite short enough—opportunities of advancement are quite rare enough, and I cannot but think it a matter of regret that a question should be chosen which could do nothing towards instruction, and would very likely lead to feelings of enmity among the members. The Fellows of the Institute are men of all degrees of opinion; a great number of them are very eminent, some the most eminent in their walk in life, and all of them men of experience, who have passed through their time of apprenticeship, and, except in as far as one can always be learning, have learnt all that they are likely to learn; and here, therefore, we have a body of men in every way competent, and indeed supposed to deal with questions respecting the government and practice of the profession, and to this body questions of this sort may conveniently be left, rather than to a body of men mostly young, and incapable of forming out of their own experience a weighty opinion. On the other hand, the study of architecture leads the student into so many paths—artistic, scientific, and historical—all opening up matters of the most absorbing interest, that one would think it an easy thing to select a subject fit and instructive, and remarks on which by the elder members would be most valuable to the younger. I would speak with great respect of Mr. Payne's remarks: they were put fairly, and although his opinions were pronounced on one side, they seemed to me to be the result of conviction, and not of bias. But I do protest most earnestly and most emphatically against his statements, both implied and explicit, about builders; such language as he used is in the highest degree inexpedient before a meeting such as that of which I write. It is true that Mr. Payne, after heaping up accusations, said, "There *may* be honest builders;" but this and his other saving clauses only tend to make the matter worse. Remarks of this nature can do *no* good, but they can add another care, unnecessary and imaginary perhaps, to the diligent student anxious to act honestly by all men, and already surrounded by difficulties enough. Mine, sir, has been an ungracious task, but the writing of this letter has been actuated by the sincerest and most ardent wish for the welfare of the Association, which is doing noble work for the advancement of the younger members; but in this instance I am bound to think it has wandered from its path.—I am, &c., A SILENT MEMBER.

THE BALLOT AND THE A.A.

SIR,—As the usual meetings of the Architectural Association do not probably comprise so many as one-half of the members, and as the meeting of Friday, 13th inst., was not an exception in that respect, and as you give no general report of the proceedings, may I be allowed to offer some suggestions as to the proposed alterations of the rules.

An examination of these rules will lead most minds to the conclusion that the success to which the Association has attained is a result of its wise government, and consequently of the rules, and although the names of the men who compose the committee are sufficient warrant that the report upon them which we shall have in due course will be well considered, it will be none the less an advantage if we give the matter some consideration before the report is presented, and before we accept alterations which may be reasonable only in appearance. It has been asserted that persons not "engaged professionally in the study or practice of architecture" had been admitted as members. It would be quite easy to define the conditions of eligibility which should, I think, be more precise, and I think it should be the duty of the committee to decide on those conditions what names should be offered for election or rejected. If this has been the duty of the committee hitherto there would appear to have been some laxity in its performance. The elections should, I also submit, be conducted in such a manner as should show the way in which each member has voted.

The proposition of Mr. Scott, which was, as understood, to confine the voting power to a section only of the members, such as men in practice, &c., would introduce at once the element of class prejudice—a sure obstacle to progress, and would be unjust—for, as all subscribe equally, all should have equal rights; there is also an implied assumption that many—indeed, the majority—are unworthy the trust.

The main question appears to be whether the plan of voting by ballot should be retained or not.

In course of debate it was mentioned that at one election the ballotting resulted in the ballot-box having hardly any balls in it but black ones. At the last ballot nineteen men, against the majority of whom it appears there was no valid objection, were rejected. Surely such facts are suggestive of something wrong in the principle.

The feeling of the speakers who deprecated the black-balling appeared to be that the obtaining of a ballot should be made a matter of more difficulty than at present; but if the practice be right there should be no need of an obstacle. The tendency of this time to make everything smooth on the surface at the expense of straightforwardness should not, I think, be encouraged by a body whose aim has always been to raise the tone of the profession. The success of the Association has been great, but it will be still greater if it decides to take the conspicuously superior moral stand-point of open voting.

Let me urge the rejection of the ballot. We all know how much the purity of any duty owes to the criticism of a healthy public opinion. The ballot is corrupt: it contains, as all secret things do, a strong element of decay, is the favoured engine of cliques, is not unfrequently the means of great injustice, and it should be remembered that in the matter of parliamentary elections no one ever claimed that it had any further merit than that of being a lesser evil than the rampant intimidation which existed before its use.—I am, &c., JOHN LEANING.

CUSTOMARY PERCENTAGES.

SIR,—I can say from my own experience, which goes back nearly twenty years, that it is quite usual to employ and to pay the surveyor for adjusting the extras and omissions on bills of quantities, and I can further say that the rates quoted by "Constant Reader" in your last issue are less than the customary rates for that sort of work.

It is almost more important to have a good surveyor at the close than at the beginning of the contract. The builder knows this, and very often calls one in then, although he does not always find it easy to secure the services of a first-rate man for such unprofitable work. In any case it is most desirable that the interests of the client should be protected, and no one can do that so well as the person who "took off" the quantities. It is no uncommon thing to find that the adjustment of variations takes more time and gives more trouble than the preparation of the original quantities. The reason for that is, very often, either that client or architect did not know his own mind at the beginning, or that the detail drawings were made as the work went on, and so, at the finish, the whole contract is in a fine state of muddle. I have generally found the client to be the chief offender.

Your correspondent states that the surveyor's fees for extricating the contract from this muddle are not always shown on the face of the final account. My experience is that the architect does not wish them to show there, as though they may have been caused by his client's vagaries, the client is about the last person who would admit the fact, and if they have been caused by the architect's delinquencies the client would probably ask him to pay them.

I believe that it is well to encourage the surveyor, by a liberal rate of commission, to go most strictly into all variations, and so to get the client the benefit of full reductions for the thousand and one little savings which the architect may have made as the work went on, but which the builder scorns to notice unless they are forcibly put before him at the winding-up by AN EXPERT.

20th December, 1878.

SIR,—In reply to "Constant Reader" I may tell him from an experience of 30 years that it is quite according to precedent and universal custom to charge the commission stated for the services rendered—viz., for measuring and drawing up schedules of quantities for the various contractors' trades. Also that on completion it is further the custom to measure up and value the extra works done (if any); also contract works omitted, and these being distinct and separate services from the first named, it is the right and custom to charge a percentage on same also.

I consider the tenor of "Constant Reader's" letter throughout is open to severe animadversion. Why should any one object to pay for services rendered? The surveyor's fees are earned hardly enough, and efficiency in his calling requires the experience of a life, and demands every possible business habit, care, attention, and technical and practical knowledge.

What does your correspondent mean by the concluding paragraph of his letter—that commissions *may* be usual but not more *just* on that account, and may be passed over as customary evils?

This appears meant as a reply by anticipa-

tion to his own query, supposing the opinions he elicits are unfavourable to his contention.

Does "Constant Reader" ever earn any money by his own exertions? If so, would he like to be told that his charging for same may be usual, but cannot be just, and may be passed over as a necessary evil? Or does he treat his tradesmen, servants, doctor, or lawyer, in this fashion?—I am, &c., B.

SURVEYORS' FEES.

Sir,—Your "Constant Reader" puts his case somewhat obscurely, probably from not knowing the usual professional terms; but I suppose what he means to say is, that he has discovered that surveyors charge a commission on extras and omissions, as well as on the original quantities. If so, he has got that piece of information quite correct, and I will present him with another—viz., that these same extras and omissions are rarely remunerative to measure and value, and that most surveyors would gladly be quit of them, commission and all.—I am, &c.,

Dec. 24. A Quantity Surveyor.

A DELICATE EPISTLE.

Sir,—The following letter was sent to several builders in this town in October. The writer says he commenced twelve years ago, but he does not say what portion of that time he was clerk of works, or when he commenced to call himself "architect and surveyor."—I am, &c.

York.

[*Copy.*]

Gentlemen,—It is with delicacy I may mention to you that my eldest son's coming of age occurs on the — of this month, and will continue to follow my profession along with myself. I should like to give him some impetus by showing him that he is worthy of what I may do for him. Should you be disposed to acknowledge me, with my other friends, with a contribution for which I should have your respect, having upon all occasions endeavoured to act in a just and businesslike way since my commencement twelve years ago,—Faithfully yours, * * *

THE ARCHITECT OF WOLLATON HALL.

Sir,—In reading over your journal, and the remarks made by Mr. Wyatt Papworth, respecting Mr. John Thorpe, the so-called architect of Wollaton Hall, he was not the architect of such building, according to drawings left, and the tablet in Wollaton Church. In August, 1875, I sent to the Building News the contents of the tablet in Wollaton Church, and there are drawings left at Wollaton which were found in the record-room, and most beautiful drawings they are of the elevations, and signed by Mr. Robert Smithson. The late steward sent them some time ago to London, and had them cleaned and framed, and they now are in the estate offices for any architect or antiquarian to see them. The tablet is inscribed on a brass plate on the south wall inside of the church:—

Here lyeth ye Body of Mr. Robert Smythson, Gent, Architect and Surveyor unto the most worthy House of Wollaton, with divers others of great account. He lived in the Faith of Christ 79 years, and then departed this life ye 15th of October, 1644.

The hall was begun 1580 and finished 1588.

Any other information you may require respecting it I will forward to you.

In July, 1875, I sent a photo of Wollaton Hall to my old friend, Cesar Daly, the editor of the *Revue Générale*, in Paris, and I write to you his reply to same:—

Paris, le 19 Juin, 1875.

Sir,—I have been absent on travel during several months, and I find on my return the photograph of Wollaton Hall that you have been kind enough to send me. The monument appears a most interesting specimen of English Renaissance, and I am quite willing to have it engraved; but if it were possible to obtain at the same time some of the details on a larger scale, and the plans of the building (of course in its original state), I would have them engraved also, to give more perfect significance to the view of the façades. Of course I suppose that no parts of the building are new; otherwise it would cease to be a correct specimen of English Renaissance—at least, if the new parts were really important.

I should be greatly obliged to you, sir, if you could find time to write a short letter giving me positive information, first about the genuine character of the parts seen in the photograph, and secondly about the details and plans. Of course, if I publish the monument, I shall be most happy to receive any historical or technical notice about it from your hands.—Believe me, sir, yours truly obliged, Cesar Daly.

P.S.—Pray excuse my very bad English, and consider my attempt to address you in English simply as a mark of my desire of entertaining a direct correspondence with you.

I am, &c., William Warner, Builder.

CHIPS.

An unusually rich and massive altar table has this week been placed in the Grosvenor Chapel, Langham-place, from the designs of Mr. John Oldrid Scott, architect. The material employed is American walnut inlaid with ebony, and the table is 7ft. long by 2ft 9in. wide. The style is a characteristic treatment of what has been called "Free Classic," the shafts being tapered and fluted with richly carved caps and cornice. It is not often that an altar in this style is now made, especially in so thorough a manner as the one in Langham-place. It is the work of Mr. Alfred Robinson, of High Holborn.

An association, to be known as the Caithness Antiquarian and Natural History Society, is in course of formation at Wick.

The Ilfracombe Local Board resolved on Friday to apply to the Local Government Board for sanction to borrow £2,000 for drainage works and a water supply.

Extensive alterations have been commenced at the parish church of Buckhurst-hill, South Essex.

At a meeting held at Swansea last week it was decided to carry out various improvements in the parish church of that town, and a committee was appointed to carry out the work.

A new Primitive Methodist chapel was opened at Truro on Friday. The building is Early English in design, and accommodates 330 persons. The street façade is of granite: on either side of the central door and the window above is a buttress carried above the gable, and finishing in an octagonal pinnacle with carved terminal. The roof principals have carved tie-rails, and rest on moulded corbels with carved stone heads. The rostrum has a front of pierced work, and the pews are provided with reclining backs. The architect was Mr. J. Wills, of Kingsbridge, Devon, and Messrs. Julian, of Truro, were the builders.

The School Board for Aberystwith, on Thursday, the 19th, accepted the tender of Mr. Williams for the erection of schools at Blaina, and approved plans for the completion of schools at Cwmtillery, and the enlargement of others at Pontygof. It was reported that new schools at Nantygio were nearly completed and could be opened in January.

Sir Frederick Leighton was on Monday elected an honorary member of the Royal Scottish Academy, and Prof. Turner honorary professor of anatomy.

A new board school has been erected at Pontillanffraith for the Mynyddi-Uwn School Board; Mr. Watkins, of Newport, Mon., is the architect.

At the meeting of the Metropolitan Vestry of St. George the Martyr, held on Tuesday week, it was resolved to increase the salary of the surveyor, Mr. Hiscock, by £50 per annum.

Following the excellent example set by Dr. J. Hincks-Bird, Mr. John Noble, of Henley-upon-Thames, has written to the metropolitan vestries and district board, offering to them £1,000 in ten sums of £100 each, towards the cost of planting trees on the suburban footpaths of London. Several of the local authorities are preparing to accept the offer.

The South Metropolitan Gas Company have determined, possibly from the fear that the consumption of gas in public thoroughfares may be diminished by the progress of electric lighting, to let out for hire gas cooking stoves.

The Leyton Local Board decided last week to instruct Mr. Bailey Denton, C.E., to carry out the award of Mr. Rawlinson as to the matter of sewerage disposal, referred to the latter engineer's arbitration by the West Ham and Leyton Local Boards.

The Great Yarmouth School Board on Friday accepted the tender of Messrs. Cox and Beach, amounting to £288 10s., being the lowest received, for the alteration of premises at Southtown, so as to fit them for use as a day industrial school.

The first meeting of the Bath Natural History and Antiquarian Field Club was held on Wednesday week, when a paper on "Subterranean Bath" was read by the Rev. Prebendary Earle, who referred to the Romano-British remains hidden 15ft. or 16ft. beneath the ground of the city. He traced the history of the city from the earliest days till now, and mentioned the discovery of a 13th century tessellated floor in the Orange-grove outside the choir of the abbey.

A new Welsh Calvinistic Methodist chapel was opened at Buckley, North Wales, on Sunday week. The contractor was Mr. John Williams.

Intercommunication.

QUESTIONS.

[5621.]—**Strength of Timber.**—I should be glad if some reader would kindly give me a formula for finding the transverse strength of wood beams, also a formula for transverse strength of stone.—J. A. A.

[5622.]—**Painting Galvanised Iron.**—Grateful thanks for information from any kind subscriber who will state the process or the mixture of paint to adhere to galvanised iron or zinc, and also quality or preparation required for painting 4 coats on trowelled cement plastering, so as to prevent its peeling off when finished.—Deficiency.

[5623.]—**Compensation for the Use of Party Wall.**—A railway company purchases certain property in a town for the purpose of making a new station; they lay out a street 30ft. wide, running parallel with the side of the new station, and pave the road, and flag the side walks. I am possessed of a property the side of which now (by reason of the alterations) abuts against this new street. Between my property, however, and the 30ft. line of street width there is a narrow strip of ground (say, 12in. wide), which, although it is paved, the railway company still lay claim to as their property, besides which the side wall of my house is a party wall, and when they purchased my neighbour's house, for the purpose of pulling it down, they of course bought the rights pertaining to that party wall. My question is this: Have the company, by flagging close up to the party wall, given up all right to the ground, and have I a right to build shop fronts on the site of the party wall, or have the railway company a claim on me for permission from them to build as I wish?—G. D. I.

REPLIES.

[5612.]—**Church Restoration.**—Having seen "Harrow's" sketch, which he has sent to the Editor, I am of opinion the present pitch of roof is not too high, and ought to be retained if there is any possibility of saving the present roof. I rather thought the roof cut off more of the arcading than it does. If sketched truly as regards the height of roof and arcading, the tower can scarcely suffer much from the intrusion. The design of roof appears to be an old one, though of this I cannot be sure without seeing the structure itself, and if at all possible I should suggest the reparation of the old timbers, so as to render the roof efficient. There may, however, be some point which the sketch does not give, which would render the opposite course desirable. If the roof has to come down *in toto*, and there is nothing in the interior to prevent a roof whose ridge would just clear the sill of the arcading, a very good reason exists for the substitution of one of lower pitch. Probably the old groove exists below the present thatch; if so there would be another motive for the change. It is hardly, as "Harrow" puts it, a question of sacrificing church by altering pitch of roof, or the tower by retaining the high roof, as the question of removal of old roof is, if I understand, already determined, owing to its unsafe state, and should be made only on such conditions.—G. H. G.

[5615.]—**Sashes and Frames.**—If the joiner were instructed to make the new windows correspond with the model sashes and frames he could not be very well called upon to affix the hanging stiles or angle beads, as these are distinct things. In a question of this kind there should have been an agreement in writing drawn up, in which the sample windows should have been clearly defined. As it is, the misunderstanding is one of those common occurrences in which the employer, while he obviously intended the whole window to be reproduced, did not make himself so clearly understood, while the joiner was probably equally anxious not to do more than he was absolutely compelled to do.—Architectus.

[5617.]—**Brown Oak.**—There are many varieties of oak, and these differ as materially in colour as they do in grain. The colour has much to do with locality. In the neighbourhood of Basingstoke a deal of brown oak is grown, and there the soil has to do with the tone the wood assumes, precisely as the warm red soil of Devonshire produces the glorious brown of the Devon ox. Take one of these cattle from its native fields, and let it graze a year or two in Essex or the cold North, and watch the result. It will then be found that the original colour of the beast will have altered materially. The best brown oak is old oak—*i.e.*, beams taken from ancient buildings, and worked up again. Personally I prefer this to any material I know, both for tone and durability. Indeed, I believe the oak of Old England may be safely pitted against any known wood in use in the world.—Harry Hems.

[5617.]—**Brown Oak.**—The dark colour is not created in this wood by the cabinet-maker—it is natural to the wood of ancient trees when grown on certain soils. The colour is the deepest in trees that have long stood hollow, and the figure is the finest in those forming burry excrescences, commonly known as pollard trees. The presence of this colour shows some progress towards decay, and it is valuable only for ornamental purposes.—W. S., Hull.

LEGAL INTELLIGENCE.

Important Light Case.—Substantial Obstruction of Light by Raising of Buildings.—Davenport v. Riddale and Another.—Baron Cleasby, sitting in the Exchequer Division at the City Guildhall, with a special jury, was engaged on four days of last week in trying this case, which is one of considerable importance in towns, and more particularly in the City of London, as showing what may be considered not a substantial injury to light to neighbouring property by the raising of buildings in excess of old outlines. The case is also of interest as one of the first of the class removed from the Chancery to the Common Law side, in order to be heard by a judge and special jury in lieu of a Vice-Chancellor. The counsel engaged were Mr. Brown, Q.C., Mr. A. L. Smith, and Mr. Watson for plaintiff: Mr. Kemp, Q.C., and Mr. Oswald for defendants. The plaintiff in the case was Mr. Davenport, a china, glass, and earthenware manufacturer, carrying on business at 82, Fleet-street, E.C., and the defendants were the owners of the block of red brick buildings, in Renaissance style, recently erected at the corner of Fleet-street and Salisbury-court. A number of professional witnesses were called on either side, and a vast array of figures marshalled with reference to the buildings which had been pulled down, and the new premises erected on their site. As to measurements, there were discrepancies in the evidence; but it appeared proved that the width of Salisbury-court was and is about 23ft. at the pavement level, and was about 24ft. 2in. at the tops of the buildings. The defendants' former premises rose clear from the pavement to the parapet 43ft. 9in., and recessed 12in from that level was a range of nearly continuous dormers; the gutters were about 4ft. above the parapet, and nearly uniform with it, making a total of 47ft. 10in. The new premises rise for two stories upon the old lines, are then set back 14in., and rise to a total height of 49ft. 10in., at which level a projecting cornice (with pediment 1ft. higher) forms a sky line. A hipped roof is recessed and carried up another 12ft., with slightly-projecting dormers. Practically the question at issue became whether the addition of 3ft. in height of the new wall beyond the 47ft. 10in., which was the height of the old one, materially obstructed the passage of light to the plaintiff's premises, standing upon the opposite side of Salisbury-court, but 23ft. distant. The plaintiff gave evidence in person, as did also Miss Cotton—his principal saleswoman—and other employés, to the effect that his premises were not so well lighted as formerly, and in support called Mr. Marsh Nelson, architect—who objected to the alterations at the time they were being carried out—Mr. Woodthorpe, Mr. R. Phené Spiers, and Professor Kerr, all architects. The last mentioned produced models and diagrams, which, it transpired in cross examination, were prepared upon current data. Defendants called their architect, Mr. Alexander Peebles—who had designed the new premises—his assistant, Mr. Nicol, and Mr. Williams, from the office of Mr. Barnes Williams, the surveyor of the freeholders of the land, who produced other models and drawings, and proved the exact measurements of the buildings before pulled down and as now erected. Mr. Peebles gave in evidence his opinion that the access of light to plaintiff's premises had not been materially interfered with or disturbed; and this opinion was supported to some extent by Mr. Clifton, Mr. Hesketh, Mr. Francis Fowler, and Mr. O'Ana. The buildings were visited by the jury. Baron Cleasby, in his summing up, went minutely into the evidence and its discrepancies, and said the question for the special jury to consider was this:—Was plaintiff prejudiced in the enjoyment of light to his premises by the alteration to defendants' building—*i. e.*, to some sensible and appreciable extent? It was not a mathematical question of the passage of rays of light, for there were many cases in which a man might suffer considerable loss of "passage of rays of light," and yet would have no right to complain. He called particular attention to the details of measurement, because the more obliquely a light came the less influence would be got from it, and the more damage would be sustained in consequence of alterations. He pointed out that the dimensions given for plaintiff were based upon incorrect particulars, and that this affected the degrees of light obscured. Stress had been laid by defendants on the increment of light afforded by the splaying off the Fleet-street corner, but as it would be difficult to ascertain that advantage precisely, although it had some value, he recommended the jury to dismiss it. As to the diminution of light deposed to by the employés of plaintiff, his lordship suggested that they might have based their comparisons on the difference between the time when the old buildings were pulled down and the completion of re-erection. For the defendants it had been said that there was nothing unusual in the new building, but this was not a question of use, but of property—that in light—which the law was bound to protect from damage. The jury must not take into consideration whether the effect of a verdict for plaintiff would be to pull down the defendants' premises, but confine themselves to the issue: Was the plaintiff prejudiced in the enjoyment of light to his premises by the alteration made to his premises by the defendants? The jury retired, and after an absence of ten minutes returned, stating that they found that Mr. Davenport's light was not materially affected by defendants' building. Baron Cleasby made an order, refusing the motion, costs to follow the event, and certifying for a special jury.

Compensation Case.—At the Surrey Sheriffs' Court last week, Mr. Under-Sheriff Abbott presided over a special jury, in the case of "Kelaway v. the Metropolitan Board of Works," which was a compensation claim of upwards of £2,000, for some leasehold premises, No. 51, Church-street, Camberwell, required to widen the thoroughfare as a public improvement. Mr. Kemp, Q.C., and Mr. M'Mahon were for the claimant, an undertaker and general contractor for building purposes; Mr. Philbrick, Q.C., and Mr. Cripps were for the Metropolitan Board. In 1869 a lease was granted for 21 years at £50 a year, and was now said to be worth £95 a year by one surveyor, £100 by another, and £105 by a third. On behalf of the board the annual value was put at £65. The net profits were about £400 a year for the last three years, and £1,200 was asked, at the rate of three years' purchase. The jury assessed the compensation at £900.

A Dilapidated House.—At Lambeth Police-court last week the owner of No. 50, Loder-street, Peckham, appeared to a summons taken out on behalf of the Camberwell Vestry for neglecting to repair the roof of that house, which was in such a condition as to be a nuisance and injurious to health. The matter had been first brought before the vestry, when it was recommended by the works committee that no proceedings be taken, as they considered it a question between landlord and tenant. The vestry, however, acting on the report of Dr. Bristow, their medical officer, decided by a majority that proceedings should be taken in the police court. After hearing evidence fully bearing out the complaint the magistrate said he was satisfied that it was a proper case for the court, and made an order for the repairs to be done forthwith, the defendant to pay the costs of the case.

A Building Society Case.—At Cardiff county court on Wednesday week, Judge Herbert heard the case of Jenks v. No. 2 Canton Benefit Building Society, an action brought to recover £6 16s. 6d. for 6 years' interest at 5 per cent. per annum, due to the plaintiff in respect of his deceased wife's shares in the society. The facts were not disputed; the question submitted to the judge was whether the society was liable for 5 per cent. on the total amount deposited or 5 per cent. per annum. The rule, as in many other societies of the kind, read as follows:—"Should a member die before the termination of the society, and the relatives elect to discontinue membership, the principal be repaid to the representatives with 5 per cent. interest, less the current year." The judge held that the rule should read as if per annum had been inserted after the word "interest," and accordingly gave judgment for plaintiff with costs.

Damages against Brick Manufacturers for a Smoke Nuisance.—At Halifax County Court, on Tuesday week, Judge W. de Longueville Giffard heard the case, Spencer *v.* S. and W. H. Jagger, in which a market gardener sought to recover £41 from a firm of brick manufacturers, as damages sustained to crops by reason of smoke from defendants' chimneys. The damage done to the crops by smoke and other noxious vapours was not denied, but defendants urged that plaintiff must prove it was traceable to and caused by their works, whereas there were two iron foundries and thirteen factories within a radius of a quarter of a mile. In support of this the case of Tipping *v.* the St. Helen's Smelting Company was quoted. Mr. Jarmain, public analyst for Huddersfield and Halifax, having proved that traces of sulphur could be found on the leaves of the plants, the judge expressed an opinion that some amount of damage was caused by the vapours from defendants' works, and gave a verdict for £25.

WATER SUPPLY AND SANITARY MATTERS.

Blackburn.—Works for the supply of the high level district, beyond reach of the gravitation levels, have just been completed. These consist of a well and bore-hole, 215 feet deep, the bore-hole being 20in. diameter, put down by the steam-boring machinery of Messrs. Mather and Platt, Manchester. An engine-house has been erected over the well, and a horizontal engine is employed to work bucket and plunger pumps, by which the water is lifted from the bore-hole and thrown up to a reservoir at a height of 130 feet above the engine-house floor. The reservoir has been excavated in rock, the walls formed of concrete, and lined with brickwork in cement. It is covered in by a series of cast iron columns and girders, and arched with 9in. brickwork in hydraulic mortar, puddled, and soiled over. The reservoir will contain 560,000 gallons, and gravitation mains will distribute the water over the high level district, which varies from [illegible] to 730 feet above mean sea level or ordnance datum. The works have cost about £[illegible], and have been designed and carried out for the Corporation by Messrs. Bryerly & Holt, civil engineers, Blackburn.

Deep Boring for Water.—The New River Company have been for some time past sinking a deep well at Turnford near Cheshunt, in Hertfordshire, in search of the waters of the lower greensand. The work has been carried to a depth of 900ft. from the surface, and is now in the gault. The shaft is lined all the way down with a wrought-iron tube 26in. in external diameter, so as to exclude the upper waters. Messrs. T. Docwra and Son, who are the contractors for carrying out the undertaking, are now going to continue the exploration by means of a diamond drill exceeding in size any previously made. The apparatus in question has just been manufactured for the Diamond Drill Company, of Victoria-street, Westminster, according to the patent design of their engineer, Mr. James K. Gulland. The drill is of steel, in the form of a ring or shallow cylinder 23in. in diameter, and 9in. deep. On its edge are 48 opaque diamonds set in plugs or holders. Although firmly fixed, these admit of easy removal so as to allow the insertion of fresh diamonds without damage in the removal of the old ones. This species of "iron crown" will be screwed on to the base of the tube forming the lower end of the boring machine, and when driven by steam power will be capable of bringing up cores 19½in. in diameter. The requisite arrangements are made for keeping the drill cool by the circulation of water. Much interest attaches to the operations at Turnford, both in relation to the water supply and the proximity of the primary rocks.

STAINED GLASS.

Kington Magna, Dorset.—A new west window has been placed in the church of this parish by Miss Dugdale, daughter of a former rector, to the memory of her parents and sisters. The stained glass work has been executed in the highest style of art by Messrs. Heaton, Butler, and Bayne, of London. The three principal lights represent the Infant Saviour in the centre, and on each side the "Adoration of the Magi," and that of the Shepherds. The lights in the tracery have three angels bearing a shield, charged respectively with the Greek "A and Ω, and the sacred Monogram 'I. H. S.'" The stonework of the window, which is also new, is of the Decorated style of architecture, and replaces one which was out of keeping with the other windows in the church, being of the debased period. This part of the work was executed by Mr. T. P. Lilly, of Gillingham, at his Chilmark, Wardour, and Tisbury Quarries.

A Local Government Board inquiry was held at Brymbo, on Tuesday week, before Mr. Samuel J. Smith, C.E., with reference to an application from the Wrexham rural sanitary authority for sanction to borrow for works of sewerage at Brymbo the sum of £5,600. The plans were explained by Mr. W. H. Glennie, the engineer for the scheme. Objection was raised to the scheme on the ground that a 4ft. seam of coal remained unworked only 45ft. from the surface, and that this when got would damage the sewer by subsidence.

A Local Government Board inquiry was held at Cleckheaton on Thursday week, before Lieut.-Col. Ponsonby Cox, on an application of the Cleckheaton Local Board, praying that the townships of North Brierly, Huntsworth, Cleckheaton, Liversedge, and Heckmondwike should be joined into one district for drainage purposes and for the construction of one main outfall and sewage work.

The heirs of M. Gannal have found among his papers a memoir relative to the artificial preparation of diamonds by the reaction of phosphorus upon carbon sulphuret.

The stained window erected as a memorial of the late Mr. William Shaft in St. Nicholas parish church, Arundel, was unveiled on Sunday week. The window, which was executed by Messrs. Gibbs and Co., of London, represents Moses, Aaron, and Joshua, as typical of the Law under the Jewish dispensation.

On Monday week, Mr. Crawshay Bailey visited Pentre with the Vicar of Neath, whom he requested to select a site in the Torr Fields for a new parish church for Ystradyfodwg. Mr. C. Bailey promised not only to give the land, but to build the church at his sole expense, and a local newspaper says that it will be one of the most expensive churches ever erected in Glamorganshire.

The Corporation of Norwich determined at their last meeting to apply to the Public Works Loan Commissioners for the borrowing of a sum of £10,000 for the purposes of an improvement scheme to be applied to an "unhealthy area" in St. Paul's parish under the provisions of the Artizans' Dwellings Improvement Act.

Our Office Table.

The re-decoration of the principal rooms in the Royal Pavilion formed the subject of a stormy discussion at the meeting of the Brighton Town Council on Wednesday week. At the previous meeting it had been complained that the decorative work then in course of execution was not equal in character to that which it replaced. Mr. Sabine re-introduced the subject by inquiring whether any steps were contemplated to put a stop to the decoration of the Pavilion rooms. He said there was a strong feeling both in and out of the Council that the decorations were not being treated in a manner conducive to their attractiveness, nor appropriately to so splendid a building: in colour, style, and execution, the work was miserably inferior to that which it replaced, and he drew particular attention to the South Drawing-room. Another member complained that boys had been engaged in the rooom just referred to, and that part of the work was being done over again. He pressed for a reply as to when the work would be completed, and the estimated cost. The ex-Mayor (Alderman Mayall) would have liked a much higher style of art, but they could not expect to get talent equal to that of the original painter for £2 10s. a week. To this Mr. Farr retorted that the Town Council were not justified in paying £2 10s. a week to have a valuable property spoilt, and that the Pavilion was not a place for apprentices to learn their trade in. He referred to the Greek fret around the windows, which he said was inaccurately set out, in which he was confirmed by succeeding speakers. Some very strong expressions of disapproval of the style of work having been made, Alderman Martin, the chairman of the committee under whose direction the work is being carried out, replied, saying if any one was to be blamed it was the borough surveyor, in whose hands the whole work had been placed. From the wholesale condemnation of the work, one could imagine that a most ruthless piece of vandalism was going on—(hear, hear)—he recollected well the gentleman who said "hear, hear" having a contract at the Town Hall, and he also remembered the severe strictures passed on the painting out of some of the beautiful ceiling, the work of Sir Christopher Wren's great man, with a sort of pea-soup colour, in the course of a day. He alluded to Mr. Sendall. The Mayor here vainly endeavoured to stop the alderman, and a lively scene ensued, Mr. Sendall protesting that he ought not to be attacked for a contract carried out before he was a member of the council. After the interchange of some personalities, the subject was allowed to drop without action being taken.

The death is announced of Mr. Joseph Nash, the water-colour painter, at the age of 71. He commenced exhibiting at the Old Society of Painters in Water Colours, as far ago as 1835, showing drawings of French cathedrals and antiquities. In 1838 was published "Architecture of the Middle Ages," with illustrations from his pencil, and between 1839-1849 appeared "Mansions of England in the Olden Time," in four series, Mr. Nash's interiors, &c., being lithographed. Among Mr. Nash's pictures were "The Queen's Visit to Lincoln's-inn Hall," exhibited in 1846; "Interior Views of the Great Exhibition in 1851," "Charles V. visiting Francis I. during his Confinement," shown at the Water-Colour Society's Exhibition in 1865, and "The Chapel of Edward the Confessor in Westminster Abbey," shown at the same place in 1866.

Near Fernshaw, in the Dandenong district, Victoria, there has recently been discovered a specimen of the "Almond Leaf Gum" (*Eucalyptus amygdalesia*), measuring 380ft. from the ground to the first branch, and 450ft. to the topmost wing. This tree would overtop the tallest living *Sequoia* by 125ft., and is probably the tallest living tree in the world. Its girth is 80ft., which is less than that of many *Sequoias*.

From the estimates for 1879 of the Metropolitan Board of Works, just issued, we see that the total charges are expected to be £587,596 17s. 7d. in gross, and net £581,196 17s. 7d., equal to a rate of 5·82d. in the pound on the present rental of £23,960,109. This is an increase of £95,994 on last year, amongst the chief items of extra expense enumerated being the freeing of metropolitan toll-bridges, £57,608 against £17,503 last year; artisans' dwellings improvements, £31,581 against £5,992 10s.; and fire brigade working expenses, £60,330 against £48,895 15s. 5d.

The absorbent power of wood for water has lately been studied by M. Maumené, his method being to dry the various pieces—first, in a stove in presence of sulphuric acid, then immerse them in water. It has long been known that different woods are very unequally porous, but the differences observed by M. Maumené exceed what might have been expected. He finds, in fact, that the absorbent power varies between 9·37 and 174·86 per cent. of the wood.

A scheme is at present on foot for the restoration of Haworth Church, and Mr. T. W. Reid writes to the *Times* to ask if it is absolutely necessary that this building should be destroyed, and the graves of Charlotte and Emily Brontë rudely disturbed, in order that a handsome Gothic edifice should be provided for the satisfaction of the incumbent of Haworth and the convenience of the parishioners. He trusts "that some strong protest will be made against the act of vandalism now contemplated, if it were only to show that all Englishmen are not indifferent to the preservation of a 'national monument' so precious and so interesting as Haworth Church."

A memorial praying for the establishment in Oxford of a Museum of Archæology and Art has been addressed to the Hebdomadal Council of Oxford University by a large body of professors, rectors, wardens, and tutors of colleges. In this document it is suggested that some practical scheme may be laid before the commissioners, who have already formally recognised the project as a fitting object for the expenditure of University funds. They propose a new building, in which space would be afforded for a series of casts to illustrate the whole history of Greek and Roman sculpture, as also for a collection of models, casts, and plans in relief in illustration of ancient classic architecture as well as copies of the chief products of the industrial arts of Greece and Rome. The suggestions embrace a collection of the chief books on classical epigraphy together with the marbles actually in the possession of the University, and a complete library of classical numismatics, and a series of casts from the most typical coins, to be placed under a competent curator. They add their conviction that a valuable stimulus to the study of classical archæology in this country would be secured by some arrangement similar to the German and French institutions at Rome and Athens, or by means of travelling studentships. Amongst the 140 names appended to this memorial we note those of Professor Max Müller, Mr. Mark Pattison, rector of Lincoln, Dr. Perceval, president of Trinity, and the librarian of the Bodleian.

At the meeting of the Liverpool Engineering Society held last week Mr. R. Souttar, C.E., delivered his valedictory address as president, and in the course of his remarks spoke of recent scientific inventions in a matter-of-fact way. The telephone and the phonograph, which were to revolutionise the world, had proved little better than scientific toys, and considering that the powers of electricity as an illuminating agent were well understood, the excitement we are passing through is discreditable. "An American applied for a patent on electric lighting, and gas stock fell 30 per cent. As, however, he had taken out 269 patents, of which only three were at work, it was about ninety to one he had not found out anything overwhelming this time."

M. de Lesseps has lately returned from Tunis, and has given an account (*Comptes Rendus*) of the manner in which M. Roudaire is at present carrying out a series of soundings and measurements in the region of the Chotts, with reference to the proposed interior sea. M. de Lesseps has called attention to the evidences of the sea having formerly existed in the Chotts. The region which is now sandy, is covered with Roman ruins, indicating a period in which the district was in a flourishing state. One of the most beautiful is that of an edifice as fine as the Coliseum at Rome, and which was erected by Gordian, after his candidature for the empire.

The electric light was experimentally used at the London-bridge terminus of the London, Brighton, and South Coast Railway on Saturday afternoon and evening for lighting the open space between the main line and Crystal Palace line booking-offices and the platform barriers. The Gramme machine and Suisse lamp were employed, the motive power

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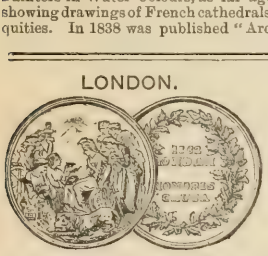

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